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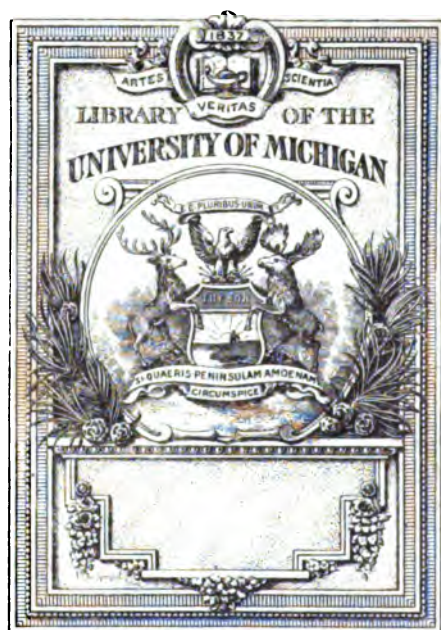
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G
7
. R89

..	v
ix	x
xi	xiii
xxi	xxiii
xxix	xlix

ББКК.	
ember	1
terior of	
and 1845.	
unsmitted	
ate for the	
Royal Geo-	
ary, 1847 .	85
Lord Col-	
March 22nd,	
.	130
By Lieut. T.	
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th, 1846 .	145
ut 200 miles up	
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Athos.

THE
JOURNAL

OF THE

118158

ROYAL GEOGRAPHICAL SOCIETY

OF

LONDON.

VOLUME THE SEVENTEENTH.

1847.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.

MDCCCXLVII.

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CONTENTS OF VOL. XVII.

	PAGE
REPORT of the Council	v
Balance-Sheet for 1846	ix
Estimate for 1847	x
List of Officers	xi
List of Members, &c.	xiii
Names of Individuals to whom the Royal Premium has been awarded	xxi
The President's Address on presenting Medals	xxiii
Address at the Anniversary Meeting, May 24, 1847, by the Right Hon. the Lord COLCHESTER, Capt. R.N., &c. &c., President	xxix
Accessions to the Library	xlix

ARTICLE

- I.—On the Nile and its Tributaries. By CHARLES T. BEKE,
Esq., PH. D., F.S.A., F.R.G.S., Corresponding Member
of the Geographical Society of Paris 1
- II.—A condensed Account of an Exploration in the Interior of
Australia, by Capt. CHARLES STURT, in 1844 and 1845.
Extracted from his Journal, and from Papers transmitted
to the Right Honourable the Secretary of State for the
Colonies, and by him communicated to the Royal Geo-
graphical Society. Read 8th and 22nd February, 1847 85
- III.—On the Yang-tsze-kiang. By the Right Hon. Lord COL-
CHESTER and Capt. COLLINSON, R.N. Read March 22nd,
1847 130
- IV.—Remarks on the Isthmus of Mount Athos. By Lieut. T.
SPRATT, of H.M.S. 'Beacon.' Communicated by Com-
mander GRAVES, F.R.G.S. Read March 9th, 1846 145
- V.—Abridged Account of an Expedition of about 200 miles up
the Gambia, by Governor Ingram. Communicated by
the Right Hon. the EARL GREY. Read 26th April, 1847 150

ILLUSTRATIONS.

Map of the Countries South of Abessynia.
 Map of Capt. Sturt's Route.
 Map of the Yang-tsze-Kiang.
 Map of the Isthmus of Mount Athos.

Royal Geographical Society.

1847.

REPORT OF THE COUNCIL,

READ AT THE ANNIVERSARY MEETING, 24TH MAY.

THE Council have to report that, since the last Anniversary Meeting, there have been elected 19 new Members. There have occurred 42 vacancies, of which 11 are by death, 20 by resignation, and 11 have been struck off for non-payment, and the Society now consists of 672 Members, besides 39 Foreign Honorary and 22 Corresponding Members.

Finance.—In pursuance of the resolution of the Special General Meeting of the 13th of May, 1846, "that the Journal be sold to Members," the Council entered into an arrangement with Mr. Murray, the publisher, by which (on the understanding that a certain number of Members would purchase the Journal) he undertook to publish it for one year at his own risk, without any charge to the Society. Under this agreement, the two Parts, forming Vol. XVI., have been published.

The subject of removing to more commodious and, at the same time, cheaper apartments, has also been fully considered by the Council at successive Meetings; but, after viewing several houses, it was found impossible to obtain a suitable one, in such a situation as appeared desirable, at any reduction of rent which would justify the heavy expense necessarily consequent on a removal of the Society's property to any new abode.

In the month of September last the Librarian, Mr. J. Shillinglaw, having resigned his situation, the Council, at the suggestion of Colonel Jackson (who agreed to undertake the general superintendence of the books and maps without any increase of salary), determined on effecting a saving by abolishing the separate office of Librarian, and substituting a Clerk at a salary of 50*l.* a-year; a Porter and Housemaid being at the same time

appointed at a salary of 30*l.* a-year and lodging in the house, in the place of the messenger, who had received 10*s.* a-week. By this change a saving of 46*l.* a-year was effected.

On balancing the accounts at the close of the year, a deficiency (chiefly arising from the cost of publishing the Journal in 1845) was found, which rendered it necessary to provide 274*l.* 18*s.* 6*d.* beyond the funds in hand. This the Council have done with much reluctance by selling from the funds of the Society 300*l.* Consols; but they felt it a more becoming course than to leave the debt to be liquidated by their successors. Every outstanding debt on the 1st of January was thus paid off, and a small balance kept in hand.

The sum of 200*l.*, the contribution of the Government and the East India Company towards aiding the late Mr. Brockman in his journey to Hadramaut, not having been applied to the purpose originally intended, the Council have directed it to be invested in the three per cent. Consols; this has been done, and stock to the amount of 224*l.* 1*s.* 10*d.* purchased.

Secretaries.—In February Mr. Murray announced to the Council that he must decline to continue publishing the Journal on the terms agreed on. This heavy charge being thus again thrown upon the funds of the Society, it became necessary for the Council once more to consider the whole state of its finances, and Colonel Jackson, in the most handsome manner, offered to release the Council from any difficulty as regarded himself, by tendering his resignation of the offices of Secretary and Editor of the Journal: a Committee was appointed to consider the whole question, upon whose report it was resolved—

1. That both the Secretaries of the Society, Members of the Council according to the regulations, be henceforth Honorary Secretaries.
2. That an Assistant Secretary be appointed, at a salary not exceeding 150*l.* a-year, to perform the duties of the late Secretary and Editor.
3. That an advertisement to this effect be inserted in the 'Times,' 'Literary Gazette,' and 'Athenæum.'
4. That the edition of the Journal be reduced from 1250 to 1000 copies, and that the volume do not exceed thirteen sheets.

5. That the Society revert to the old practice of gratuitous distribution, but that all Members be required to send to the Society for their copies, and that Members not applying within one year shall only be able to procure such copies through application to the Council.

The advertisement produced a large number of candidates, from amongst whom the Council have selected Dr. William Humble as the gentleman best qualified to perform the duties of that office.

The resignation of Colonel Jackson as Secretary and Editor has already been alluded to; and the Council regret to have also to announce that the Honorary Foreign Secretary, the Rev. G. C. Renouard, has again pressed upon them the tender of his resignation, which they felt they could no longer decline to accept. In each of these gentlemen the Society will lose a valuable and efficient officer. Mr. Renouard has for a long course of years given to the Society the gratuitous benefit of his great learning, especially in Oriental literature; and, under Colonel Jackson, the Journal has been most carefully edited, and published with the greatest punctuality; the accounts and correspondence of the Society have been kept with great regularity, and a general Index of the first ten volumes (forming itself a volume of 200 pages, executed entirely by himself, and gratuitously) has been published.

Arrears.—Although every exertion has been made to recover the arrears due to the Society, they amounted, on the 1st of January of the present year, to the sum of 440*l*. Of this sum a very small portion only has since been received; the collector, however, states that the subscriptions for the current year have been, for the most part, punctually paid.

Royal Donation.—Of the two gold medals, the donation of Her Most Gracious Majesty, the Patron's Medal has been awarded to Dr. Ludwig Leichardt, for his explorations in Australia, and especially for his journey from Moreton Bay to Port Essington; and the Founder's Medal to Captain Charles Sturt, for his discoveries in Australia, namely of the rivers Darling and Murray, and more especially for his journey in 1845-6, fixing the eastern limit of Lake Torrens, and penetrating into the heart of the continent to lat. 24° 30' S., long. 138° 0' E.

Library.—The accessions to the library since the last Anniversary Meeting consist of 344 books and pamphlets, 56 sheets of maps and charts, two atlases, several sketches and portraits, and a *fac-simile* of an ancient globe in the public library and museum of Frankfort-on-Maine.

In conclusion, the Council confidently trust that the efforts they have made to place the pecuniary affairs of the Society on a firm basis will, with the co-operation of the general body of the Society, secure its permanent prosperity and stability, and enable it fully to carry out the intentions of its founders; but it must not be disguised that to effect this desirable result the exertions of all must be united to increase the number of its Members, and to provide the funds still required to place its valuable collection of books and maps in that condition which a due regard to their preservation, and easy access by Members, still continues to demand.

BALANCE-SHEET FOR 1846.

Dr.

Cr.

	£.	s.	d.		£.	s.	d.
Balance in the Banker's hands on the 1st of January, 1846	3	16	2	Rent and Fixtures			
.. of Petty Cash in the Secretary's hands	0	13	5	Salaries of Secretary, Editor, and Librarian			137 14 9
Entrance of 30 Members, at 3 <i>l</i> .	90	0	0	Collector's Wages			400 0 0
Compositions of 10 Members, at 17 <i>l</i> .	170	0	0	Messenger's Wages			21 0 0
Subscriptions of 239 Members, at 2 <i>l</i> .	478	0	0	Firing and Lights			28 0 0
Arrears paid up	96	0	0	Stationery			28 6 0
Overpaid and paid by mistake	3	13	0	Freight, Duty, Carriage of Parcels, Postages, &c.			14 7 8
Dividend on 2578 <i>l</i> . 4 <i>s</i> . 4 <i>d</i> . 3 <i>d</i> . per Cents. Reduced (Income Tax deducted)				Evening Meetings			49 19 4
Royal Premium	81	7	0	Insurance, Advertisements, and Power of Attorney			14 14 5
Journals sold	52	10	0	Instruments			7 6 0
Index sold	106	6	2	Furniture, Repairs, and Fittings			1 2 6
Mr. Alexander's Donation	10	0	0	.. (Illustrations: Part II. Vol. 13 £78 0 6			6 15 6
Mr. Kerr's Donation	50	0	0	" Parts I. and II. Vol. 15 178 13 0			258 13 6
Lord Bexley's Donation	2	0	0	" Printing Part I. Vol. 15 . 150 3 7			263 18 11
Sold out 300 <i>l</i> . at 95 <i>¢</i>	5	5	0	" Part II. Vol. 15 . 113 15 4			520 12 5
Advertisements in Journal, Vol. 15, Part II.	286	17	6	Miscellaneous Printing			
From Bornean Church Committee, 6 months' rent	12	9	0	Books, Maps, and Bindings			28 13 6
Journal (for Mr. Murray)	15	0	0	Royal Premium			10 9 0
Government and East India Company's Grants	0	8	0	Returned Subscriptions			46 10 0
	200	0	0	Sundries, including 8 <i>s</i> . received for Mr. Murray			5 3 0
				Balance in the Banker's hands			1 8 9
				" of Petty Cash in Secretary's hands on 31st Dec. 1846			279 8 2
							6 14 3
							£1,664 5 3

ROBERT BIDDULPH, Treasurer.

We, the undersigned, have examined the above accounts with the particulars thereof, and approve the same.

CHAS. R. D. BETHUNE, }
HENRY RAPER, } Auditors.

9th February, 1847.

ESTIMATE FOR THE YEAR 1847.

Dr.

Cr.

	£.	s.	d.		£.	s.	d.
Balance in the Banker's hands on the 1st of January, 1847	279	8	2	Rent and Fixtures	.	.	.
Petty Cash in the hands of the Secretary	.	6	5	Salaries and Wages:—Secretary and Editor, 150 <i>l.</i> ; Clerk,	.	.	263 13 0
Entrance of 20 Members at 3 <i>l.</i> each	.	60	0	50 <i>l.</i> ; Collector, 21 <i>l.</i> ; Messenger and Housekeeper, 30 <i>l.</i>	.	.	251 0 0
Subscriptions of 300 Members at 2 <i>l.</i>	.	600	0	Office Expenses, including Firing and Lights, Evening Meet-	.	.	
Arrears collected	.	50	0	ings, Stationery, Postages, Carriage of Parcels, Freight, &c.	.	.	100 0 0
Dividend on 2378 <i>l.</i> 4 <i>s.</i> 4 <i>d.</i> 3½ per Cents. Reduced, minus	.	.	.	Insurance and Advertisements	.	.	5 0 0
Income-Tax	.	71	17	Furniture, Repairs, and Fittings	.	.	20 0 0
Royal Donation	.	53	10	Journal	.	.	150 0 0
Journals sold	.	50	0	Miscellaneous Printing	.	.	10 0 0
Index sold	.	5	0	Books and Bindings	.	.	30 0 0
Bornean Church Mission	.	30	0	Gold Medals	.	.	46 10 0
				Sundries	.	.	13 17 0
			1,205 0 11				
Deduct Government and East India Company's Grants	.	200	0 0				
			£1,005 0 11				£890 0 0

WILLIAM HUMBLE, M.D.

Acting Secretary.

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THE QUEEN.

Vice-Patron.
H. R. H. PRINCE ALBERT.

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F.R.S., G.S., &c.
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K.H., F.R.S., G.S., &c.
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F.R.S.L. and E., G.S., M.R.I.A.
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R.A.
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D.

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Frederick, R.N.
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Bart., G.C.B., G.C.M.G., F.R.S.,
&c.
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- Drury, Capt. Byron, R.N.
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F.R.S., G.S., &c.
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George, F.R.S.
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Regt.
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F.

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&c.
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F.R.S., D.C.L., F.G.S.
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- King, Major Edward, 36th Regt.

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VOL. XVII.

M.

- Macdonald, John, Esq.
- 400 Macdonnell, Rich. Graves, Esq.
- *Macfarlane, Major J., E.I.C.S.
- Macintosh, Colonel, K.H.
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 Nugent, Lord, D.C.L., F.S.A.

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 Peel, the Right Hon. Sir Robert, Bart., M.P., D.C.L., F.R.S., S.A., &c.
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 Rawson, Rawson W., Esq.
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 Russell, the Right Hon. Lord John, M.P.
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S.

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 Smith, General Sir C., C.B., R.E.
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 F.R.S., Pres. R.A.S., F.S.A.,
 D.C.L., Corr. Ins. Fr.
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 F.R.S.
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 F.R.S., G.S.

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 650 Wilson, Capt. J. R.
 Wilson, Belford Hinton, Esq.
 *Wilson, L. P., Esq.
 Winterbottom, J. Edward, Esq.
 *Wise, Henry, Esq.
 Wittich, William, Esq.
 *Wolfe, Captain, R.N.
 Wolff, the Rev. Dr.
 *Wortley, Hon. J. Stuart, F.R.S.,
 G.S.
 Worthington, the Rev. Dr.
 660 Wray, John, Esq.,
 Wyld, Mr. James

Y.

Yates, Rev. James, M.A., F.L.S. and
 G.S.
 Yates, John Ashton, Esq.
 Yates, Joseph Brookes, Esq.
 *Young, George F., Esq., M.P.
 *Young, James, Esq.
 Young, Charles Baring, Esq.
 668*Yorke, Lieut.-Colonel, P.S.

NAMES OF INDIVIDUALS TO WHOM THE ROYAL PREMIUM HAS BEEN AWARDED.

- 1831.—Mr. RICHARD LANDER, for the discovery of the course of the River Niger or Quorra, and its outlet in the Gulf of Benin, in Central Africa.
- 1832.—Mr. JOHN BISCOE, for the discovery of the land now named "Enderby's Land" and "Graham's Land," in the Antarctic Ocean.
- 1833.—Captain Sir JOHN ROSS, R.N., for discovery in the Arctic Regions of America.
- 1834.—Major Sir A. BURNES, C.B., F.R.S., for the navigation of the River Indus, and a journey by Balkh and Bokhara across Central Asia.
- 1835.—Captain Sir GEORGE BACK, R.N., for the discovery of the Great Fish River, and navigating it to the sea on the Arctic Coast of America.
- 1836.—Captain ROBERT FITZROY, R.N., for the survey of the shores of Patagonia, Chile, and Peru, in South America.
- 1837.—Colonel CHESNEY, R.A., F.R.S., for the general conduct of the "Euphrates Expedition" in 1835-6, and for the accessions to comparative and physical geography relating to the countries of Northern Syria, Mesopotamia, and the Delta of Susiana.
- 1838.—Mr. THOMAS SIMPSON, [Founder's Medal,] for the discovery and tracing, in 1837 and 1838, of about 300 miles of the Arctic shores of America.
- Dr. EDWARD RÜPPELL, [Patron's Medal,] for his travels and researches in Nubia, Kordofán, Arabia, and Abyssinia.
- 1839.—Mr. R. H. SCHOMBURGK, [Patron's Medal,] for his travels and researches during the years 1835-9 in the colony of British Guayana, and in the adjacent parts of South America.
- Major H. C. RAWLINSON, E.I.C., [Founder's Medal,] for his travels and researches in Susiana and Persian Kurdistan, and for the light thrown by him on the comparative geography of Western Asia.

- 1840.—Lieut. RAPER, R.N., [Founder's Medal,] for the publication of his work on "Navigation and Nautical Astronomy."
- Lieut. JOHN WOOD, I.N., [Patron's Medal,] for his survey of the Indus, and re-discovery of the source of the River Oxus.
- 1841.—Captain JAMES CLARK ROSS, R.N., [Founder's Medal,] for his discoveries in the Antarctic Ocean.
- Rev. Dr. E. ROBINSON, of New York, [Patron's Medal,] for his work entitled "Biblical Researches in Palestine."
- 1842.—Mr. EDWARD JOHN EYRE, [Founder's Medal,] for his explorations in Australia.
- Lieut. J. F. A. SYMONDS, [Patron's Medal,] for his survey in Palestine and levels across the country to the Dead Sea.
- 1843.—Mr. W. J. HAMILTON, M.P., [Founder's Medal,] for his researches in Asia Minor.
- Prof. ADOLPH ERMAN, [Patron's Medal,] for his extensive geographical labours.
- 1844.—M. CHARLES RITTER, [Gold Medal,] for his important geographical works.
- Dr. BEKE, [Founder's Medal,] for his extensive explorations in Abyssinia.
- 1845.—Count P. E. DE STRZELECKI, [Founder's Medal,] for his extensive explorations and discoveries in the South-Eastern portion of Australia, and in Van Diemen's Land; and for his valuable work, in which he has consigned the results of his observations.
- Professor A. TH. MIDDENDORFF, [Patron's Medal,] for his extensive explorations and discoveries in Northern and Eastern Siberia.
- 1846.—Captain CHARLES STURT, [Founder's Medal,] for his various and extensive explorations in Australia.
- Dr. LUDWIG LEICHHARDT, [Patron's Medal,] for a journey performed from Morton Bay to Port Essington.

PRESENTATION
OF THE
G O L D M E D A L S,

AWARDED RESPECTIVELY TO CAPTAIN CHARLES STURT AND
DOCTOR LUDWIG LEICHHARDT.

THE President, Lord Colchester, thus addressed the Meeting:—

“ The Council having awarded one of the medals placed at its disposal by the munificence of the Sovereign, for the furtherance of geographical science and discovery, to Captain Charles Sturt, for his various and extensive explorations in Australia, it is my pleasing duty to remind you of the grounds upon which this honourable distinction has been bestowed.

“ So far back as the year 1827, Captain Sturt, then attached to H. M. 39th Regiment, serving in New South Wales, was appointed, in company with Mr. Hume, to follow up the discoveries of Mr. Oxley. Starting from Mount Harris, he explored the marshes of the Macquarie, and proceeding thence to the N.W. came to the bank of a large river, whose waters were found to be salt. This river he named the Darling, and followed its course about 40 miles, when he was obliged to quit it for want of drinkable water. At the close of the year 1829 Captain Sturt proceeded on an expedition to explore the course of the Murrumbidgee. He traced its downward course, from the furthest point previously reached, for 90 miles, when it delivered its waters into a broad and noble river, which was named the Murray. After descending the Murray for 9 days he passed the mouth of a stream flowing from the N., a little inferior to the Murray itself, its waters turbid but perfectly sweet. This river he considered (as proved afterwards to be the fact) to be identical with the Darling, whose upper course he had discovered in his former journey. From this junction Captain Sturt continued to descend the Murray till it emptied itself into an extensive lake which he named Alexandrina, and which he traversed till stopped by the sand-banks that separate it from the sea at Encounter Bay.

“ The discovery of the two great rivers of New South Wales would of itself give to the enterprising explorer a strong claim to the favour of this Society, but it is to Captain Sturt's more recent journey, undertaken with the view of traversing the whole extent of the continent of Australia from Adelaide to the Gulf of Carpentaria, that I wish more particularly to draw your attention. With this view Captain Sturt quitted Adelaide in August, 1844, with a party composed of Messrs. Poole, Browne, Stuart, and 14 men. Proceeding eastward to the

Murray, he followed the upward course of that river and of the Darling to Laidley's Ponds, which he reached on the 10th of October. Proceeding thence through a country, hitherto unexplored, to the N.W., he fixed his first dépôt in lat. $29^{\circ} 40'$ and long. $141^{\circ} 45'$ on the western slope of the Cis-Darling range, not more than 300 feet above the level of the sea. Here the expedition was detained from January 17 to July 14 by the excessive drought, no rain having fallen between November and the latter date. The country, however, was reconnoitred in every direction, and Mr. Poole made an excursion as far as the eastern shore of Lake Torrens. While at this dépôt the heat rose to 133° of Fahrenheit in the shade and 157° in the sun. The consumption of provisions during this long detention determined Captain Sturt to send back one-third of his party, and with the remainder, on the first fall of rain, he moved forward to a spot on the western slope, about 62 miles from the first dépôt, where he formed a second, in lat. $29^{\circ} 6'$ and long. $141^{\circ} 5'$. Before advancing from hence upon his main object, Captain Sturt determined to ascertain the nature of the country to the west. A journey of 69 miles brought him to the 'broad, dry, and sandy bed of an extensive lake, apparently 12 miles wide, extending to the S. beyond the range of vision, but coming round to the westward in a northerly direction, in the shape laid down for Lake Torrens.' The basin was found to be composed of sand and salt, with patches of clay and gypsum, and though apparently dry, it was too soft to bear the weight of a man. The basin contained detached sheets of dark blue salt water.

"Returning to the dépôt, Capt. Sturt started from thence on the 14th of August, accompanied by Mr. Browne and a part of his men, to penetrate to the N.W. Their route for the first 70 miles lay through a country of sand-ridges alternating with long narrow flats; beyond this they found a more open country, but so dry as to make it difficult to proceed. Continuing to the N.W. they traversed extensive plains subject to inundations; then high and broken ridges of sand 80 or 100 feet high, and fiery red, brought the travellers to a stony desert 50 miles in width, beyond which other sandy ridges appeared, similar to those before passed, as if a flood had swept through the range, making this breach. In lat. $25^{\circ} 45'$ the party found themselves on the banks of a considerable creek, coming direct from the N.N.W., with large and deep pools of water. This greatly raised their spirits. They traced it upwards of 60 miles, but though its bed was full of grass, the country was extremely barren. On the 6th of September they reached lat. $24^{\circ} 5'$ and long. $138^{\circ} 15'$. Beyond this they found a salt lagoon in the bed of the creek, and crossed it to the N.W., but the country became worse and worse, and at length the impracticable character of the country, want of food and water for the horses, and the illness of Mr. Browne, compelled Captain Sturt to retrace his steps, after he had advanced 400 miles from the dépôt, and reached within 200 miles of the centre of the continent. The party reached the dépôt on the 3rd of October, and, after only six days' rest, Captain Sturt, taking with him Mr. Stuart and some of the men who had been left at the dépôt during the former journey, again endeavoured to penetrate northward, but in

a direction less to the W. For 86 miles he pursued his former route—then keeping more to the N., his route for 40 miles lay through plains. Here he met a splendid creek 240 yards wide and 26 feet deep; crossing it, he proceeded 36 miles further over plains, and then came to the sandy ridges running in the same direction as before. Passing a lake about 12 miles in circumference, but whose waters were now putrid, he again met the stony desert in lat. $26^{\circ} 30'$ and long. $139^{\circ} 34'$, about 55 miles E. of his former journey. He still pushed on to lat. $25^{\circ} 58'$, when the desert nature of the country, and the fear that the pools of water which had supplied him in his advance would be completely dried up by the continued drought, he reluctantly turned his face again to the S., and only just reached the great creek, or river, in time to save his horses, some of whom had actually dropped from exhaustion before reaching it. Captain Sturt traced this, which he named Cooper's Creek, upwards in an easterly direction for 65 miles, when it became salt; and afterwards split into numerous narrow streams coming from an unbroken grassy plain, stretching to the N. and E. as far as the eye could reach. A tribe of more than 400 natives were found inhabiting several villages on the banks of this creek. They were a tall race and very peaceable, and appeared to subsist on the seeds of a coarse grass, which they stacked and thrashed out, and the seed thus obtained was pounded by the women. Hence Captain Sturt returned to his *dépôt*, but his difficulties were not yet at an end, for the country between it and Laidley's Ponds had become so burnt up by the continued drought, that it was only by killing some of his oxen, and filling their skins with water from the well at the *dépôt*, that he was enabled to provide a sufficient supply to secure his return, which he at length effected without any loss; but his own health, which had been kept up only by the energy of his mind, so long as difficulties were to be overcome, now gave way, and he was seized with a severe illness, from which he did not recover for many weeks after his arrival at Adelaide.

“For these services in the cause of geographical discovery, for the *energy* and *courage* displayed in confronting difficulties of no ordinary character, for the *prudence* with which further advance was abandoned, when it could only have risked the loss of those intrusted to his charge, for the *conciliatory conduct* to the natives, which not only avoided hostile conflict, but rendered them willing to assist the expedition, and also to excite future explorers to a display of the like qualities, the Council have awarded the medal of the founder, and I have much pleasure in now having the opportunity of delivering it into the hands of a gentleman holding high office in the colony of South Australia, and who will be able to recount personally to Captain Sturt the high value this Society sets upon his labours.”

The President, now addressing himself to Mr. Morphett, said—

“MR. MORPHETT,—I have much pleasure in committing to your hands this medal, the highest token of distinction which the Royal Geographical Society has to bestow for the advancement of geographical knowledge.”

Mr. Morphett, rising, replied—

"I am proud, my Lord, at being the recipient of such an honourable and well-merited testimonial from the Council of the Royal Geographical Society to my friend Captain Sturt. I beg to assure your Lordship that I will deliver this medal to Captain Sturt, and will endeavour to convey to him an impression of the elegant and encomiastic allusions which your Lordship has made to his arduous and valuable services in the cause of science."

PATRON'S MEDAL.

The President then proceeding, observed—

"The journey performed by Dr. Ludwig Leichhardt from Morton Bay to Port Essington, a distance of 1800 miles, through a country previously altogether unknown, prosecuted with almost unexampled perseverance, and crowned with the most complete success, opening to the settler in Australia new and extensive fields of enterprise, and connecting the remote settlements of New South Wales with a secure port on the confines of the Indian Archipelago, thus avoiding the circuitous and dangerous navigation through Torres Straits, has been deemed by the Council an enterprise worthy of the medal granted by our Most Gracious Patron the Queen.

"An account of Dr. Leichhardt's journey having already appeared in the Journal of the Society, I need only remind you, that he quitted Jimba, the furthest station of the Darling Downs, on the 1st of October, 1844, with a party of 7 persons, and followed the course of the range of mountains which runs nearly parallel to the E. coast of Australia, till he reached the S.E. angle of the Gulf of Carpentaria; thence, following the coast to westward, he quitted it where it turns to the N., and, striking directly across the country, reached Port Essington on the 17th December, 1845. Among the most important results of this enterprise, are stated to be the discovery of the Mackenzie river, the Isaack's, and the Suttor, and of an easy communication between the E. coast of Australia and the Gulf of Carpentaria, across the base of the York Peninsula. Coal was found at the Mackenzie, and the Nonda country is described as highly adapted for the pursuits of the agriculturist. Dr. Leichhardt has constructed a detailed map of the country through which he travelled; and an account of the objects of natural history which he collected will shortly be laid before the public by Sir W. Hooker. One distinguishing feature of this journey is, that it is entirely the result of private enterprise, and we are so fortunate as to have obtained the presence of one of its principal promoters, Dr. Nicholson, who will receive this medal as the representative of Dr. Leichhardt, who is himself now employed in prosecuting further discoveries.

"Dr. NICHOLSON,—I have great pleasure in delivering to you the medal of our Most Gracious Patron the Queen, as the mark of this Society's acknowledgment of the increased knowledge of the great continent of Australia gained by Dr. Leichhardt's journey; an award which shows, that neither distance, nor absence, nor foreign birth, renders the

Council unmindful of the merits of a great discoverer ; and we sincerely wish Dr. Leichhardt every success in the still vaster enterprise which he is now prosecuting, and that it may add fresh stores to geographical knowledge, and fresh honour to himself."

Dr. Nicholson rose, and returned thanks, on the part of Dr. Leichhardt, in the following terms:—

"MY LORD,—On behalf of my friend, Dr. Leichhardt, I beg to offer your Lordship my best thanks for the very handsome way in which the Royal Geographical Society has been pleased to acknowledge the services which he has rendered to geographical science by his late expedition to Port Essington. I can assure your Lordship, that even while I bear in mind the very flattering tokens of approbation which Dr. Leichhardt received on his return to Sydney, and the munificent sums of money which have been granted to him by the Colonial government and subscribed by the generous colonists of New South Wales, I still cannot hesitate to say that there is no mark of honour which will be more gratifying and encouraging to him as a man of science than that which your Lordship has just conferred on him in the name of this distinguished Society."

ADDRESS

TO THE

ROYAL GEOGRAPHICAL SOCIETY OF LONDON;

Delivered at the Anniversary Meeting on the 24th May, 1847,

BY THE

RIGHT HON. LORD COLCHESTER, CAPT. R.N., &c. &c. &c.
PRESIDENT.

GENTLEMEN,—At the commencement of the Address which I had the honour to deliver last year from this chair, I alluded to the expeditions then in progress, or under consideration, for the exploration of countries still little known, and from whose success we might hope largely to augment our stock of geographical knowledge.

The medals this day presented to Captain Sturt and Dr. Leichhardt, for their discoveries in Australia, prove these hopes to have been not altogether unfounded, and the researches of Sir T. Mitchell in the country lying between the routes of these travellers, largely increase our knowledge of that great continent, and lead us to augur favourably of the success of the new enterprise in which Dr. Leichhardt is now engaged.

In Africa our expectations have been disappointed by the abandonment of the proposed journeys of Mr. Duncan and Lieutenant Ruxton; the first not having yet sufficiently recovered from the effects of his former journey to face again the dangers of that deadly climate; and the latter for reasons not communicated to this Society. We learn, however, that a French officer, M. Raffenel, already known by his explorations in Senegambia, has set out on the arduous task of exploring that continent in its greatest breadth, from W. to E., between the parallels of 10° and 15° N. lat.

The attempts of Mr. Brockman to penetrate into Hadramaut were frustrated by the unsafe state of that country, and we have reason to fear that there is no likelihood of any European traveller being able at present to succeed in such an attempt.

We still continue without accounts of Sir John Franklin and his adventurous companions, but as his ships were fully stored and provisioned for three years, and we may reckon that whatever can be obtained from the united efforts of skill, science, and daring, guided by experience, will be performed, we may still be permitted to hope that success will eventually crown their arduous efforts, and we may rely upon Government's adopting every practicable means of furnishing supplies to such points of the coast as they may be able to approach, if prevented by insuperable obstacles from completing their passage to Behring's Straits. Other explorations in those icy regions are also in contemplation, to which I shall hereafter allude.

OBITUARY.

I must now, for a moment, call your attention to those eminent persons of our own Society, or of foreign reputation, whose loss we have had to lament during the past year. First among these must be placed General Sir George Murray, whose name will be long remembered by his countrymen at large as one of the most distinguished of those great warriors who contributed to restore the blessings of peace to Europe, and as subsequently presiding over the colonies of this empire, but who is more especially to be remembered here, as giving to this Society in its infant state the advantage of that great reputation, by accepting its Presidency in 1833.

We have also been deprived of the Duke of Northumberland, the Earl of Yarborough, the Right Hon. Thos. Grenville, Lord Chief Justice Tindal, and Sir George Gipps, lately Governor of New South Wales. Of distinguished foreign geographers we have to lament the great Russian circumnavigator, Krusenstern, an honorary member of this Society, and to whose kindness we are indebted for a beautiful facsimile of the famous Pizzigani map, constructed in the year 1367, of which the original is in the ducal library at Parma, and of which a more complete notice is to be found in the Address from the chair in 1843; three other copies alone are said to exist.

We have also to regret the loss of the Baron de Minutoli, who is said to have collected at Berlin a library of 40,000 volumes, one-fourth consisting of Oriental manuscripts.

I am happy, however, here to state, that the death of Monsieur Bonpland, the companion of Humboldt in South America, which had been publicly announced, has been since contradicted.

I must also record the loss sustained by the death of the Rev. T. Brockman, who, after the failure of his attempt to penetrate into

Hadramaut, continued exploring the coast of Arabia, and was unfortunately attacked by fever at Wady-Beni-Taber in Oman. His effects and papers having been forwarded to the British authorities in India, we may hope to benefit by the information obtained by Mr. Brockman during his long sojourn in Southern Arabia.

OUR OWN LABOURS.

During the session which is about to terminate, various papers have been read, and formed the subjects of discussion at our evening meetings. Of these I will briefly mention a letter from Colonel von Helmersen to the Society, remarking upon the great similarity between the Australian mountains and those of the Ural chain (being alike in direction, height, and geognostic character), and expressing his conviction that auriferous and platiniferous sands will be found in the former, as they are known to exist in the latter range; he concludes by strongly recommending a strict examination with a view to ascertaining whether such be the case.

From Sir J. H. Pelly we learn, that the Hudson's Bay Company have fitted out a well-equipped expedition for the purpose of surveying the hitherto unexplored portion of the coast at the N.E. angle of the American continent.

The Journal of Captain Sturt, giving an account of his explorations in the interior of Australia, has also been read before the members of the Society, and will appear in an early number of our Journal.

To Colonel Jackson we are indebted for a paper on the history and description of the various systems of representing hills, and the irregularities of the ground in general, on topographical maps. This paper may properly be included under the head of physical geography.

A very important paper by Dr. Beke, on the sources and affluents of the Nile, and which will be found in the forthcoming part of our Journal, has justly claimed the attention of the Society, but as this will be very shortly in the hands of the members, it would be supererogatory to dwell at any length upon it in my present Address.

An account of a voyage up the Tigris, by Lieutenant Jones, has formed the subject of an evening's discussion.

A memoir on the great river of China, the Yang-tze-Kiang, from its mouth to the outlet of the Poyang Lake, has also been read to you. That portion which was ascended by our fleet in 1842, as high as the city of Nankin, has been accurately surveyed by Captains Bethune, Collinson, and other officers of the navy. The upper portion is

described from the journals of those who accompanied the British Embassy in 1816, which ascended this magnificent river from the mouth of the Grand Canal at Kwa-tchoo to the outlet of the Poyang Lake.

A memoir of Baron Wrangell's, "On the best mode of reaching the North Pole," proposes to effect this object by means of dogs and sledges. The Admiral founds his hypothesis on facts collected by himself during a three years' navigation in the Polar Seas, and his plan is as follows:—"The ships of the expedition are to winter near the Esquimaux village under the 77th parallel, on the W. coast of Greenland. There should be previously despatched to this point 10 narty (a particular kind of sledge), with dogs and active and courageous drivers, likewise stores and provisions. In the autumn, as soon as the water freezes, the expedition should go to Smith's Sound, and from thence further towards the N.; on arriving at the 79°, it should seek on the coasts of Greenland, or in the valleys between the mountains, a convenient place for depositing a part of the provisions.

"In February the expedition might advance towards that place, and, in the beginning of March, another station, two degrees further N., might be established. From this last point, the polar detachment of the expedition would proceed, during March, over the ice, without leaving the coasts, or keeping along the valleys, or on the ridge of the mountains, as may be found most convenient; but deviating as little as possible from the line of the meridian, and shortening the distance by crossing the straits and bays."

The expedition, to reach the Pole and to return, must traverse, in a direct line, nearly 1200 miles, and, including all deviations, perhaps not above 1530 miles, which Admiral Wrangell considers would be very practicable with well-constructed sledges, good dogs, and proper conductors. While on the subject of Arctic exploration, we may briefly notice that Captain Sir John Ross, of the Royal Navy, so well known for his attempts to discover a North-West Passage, has written to the President of the Royal Astronomical Society, informing that learned body of his proposal to the Admiralty to proceed to Spitzbergen, for the purpose of measuring an arc of the meridian, and of endeavouring to reach the North Pole on sledges drawn by Swedish horses. Sir John conceives that former attempts have failed because a wrong season was chosen; he considers the months of April and May to be those best suited for the purpose. He proposes wintering at Spitzbergen, so as to start from thence at the proper season.

Papers on the N.W. coast of Borneo, by Mr. W. S. Harvey; on the

volcano of Saddle Island, by Lieut. Barker; on Dr. Morse's system of cerography; and one furnishing the details of a route in a part of the Sahara from Ghat to Twat, have been under consideration.

The Society has also had brought before it a paper by Governor Ingram, on the Gambia river and Settlement; from this we learn that treaties have been concluded with many of the small states on the banks of the Gambia for the extension of our commerce and the total extirpation of the slave trade. Governor Ingram gives us some very pleasing and satisfactory statements concerning the condition of the liberated slaves, colonized on the banks of the river.

And, in conclusion, you have lately heard a very detailed paper on the Physical Geography of Lower Canada, by Mr. Wittich, describing the climate, the general features, and the productions of the three portions into which, for the purposes of his subject, he divides the country.

MARITIME SURVEYS.

Home.—The surveys of the coasts of the British dominions, under the direction of the Admiralty, which were fully detailed in the Address of last year, continue to be prosecuted, with their accustomed zeal and ability, by the officers employed on them, but they present no new features requiring special notice.

Foreign.—Captain Sullivan has returned from his labours on the river Plate, and has made a most interesting sketch-chart of the Parana as high as Corrientes. Captain Denham has also returned, having finished the survey of the coast from Cape St. Paul to the river Nun.

AUSTRALIA.

Australia.—By recent accounts from Australia we learn that Dr. Leichhardt proposed to start, in October last, on a new journey of exploration into the interior. Captain Sturt's expedition having shown that the interior, in the long. of the head of the Great Southern Gulf, is a desert, at least to lat. 24° , it would be useless to attempt to cross the continent in that or in a higher latitude: Dr. Leichhardt has arranged the following plan; namely,—to proceed at once to lat. 23° , where in his last journey he found the Mackenzie and Peak range; and, as the Mackenzie was well supplied with water, to follow it up to its sources, which he calculates on finding about 80 or 100 miles to the westward of the spot where he before first came to that river. He considers he shall then be able to ascertain whether the western

branches of the supposed watershed go down to the southward to join the system of the Darling, or whether they turn to the northward and form the sources of the largest rivers of the head of the Gulf of Carpentaria. Should the latter be the case, and should the country be sufficiently well watered, he would proceed to the westward, keeping the same latitude, and endeavour to reach the waters of the N.W. coast. But should want of water not permit him to continue his journey to the westward, or even to the northward, he will then retrace his steps down the Mackenzie, and follow the track of his last journey up to the Burdekin, where it is joined by the Cape in lat. $19^{\circ} 12'$.

In following the latter river, Dr. Leichhardt entertains no doubt of finding the heads of the Flinders, after crossing either a table-land or a dividing range. He then purposes continuing his journey to the Albert, following up its course to ascertain the latitude of its sources and the nature of the country. The whole of the journey, he hopes to perform in two years.

Accounts have very recently been received of an important journey performed by Sir T. Mitchell, with the object of reaching the Gulf of Carpentaria from the Darling, of which I must endeavour to give a sketch, although we have not yet received the details, except through the public prints.

Sir T. Mitchell started from the junction of the river Macquarrie with the Darling, in lat. $30^{\circ} 6' S.$ and long. $147^{\circ} 33'$; proceeding to the N., he crossed the Narran Swamp, and thence ascended the river Balonne, to a hill range in lat. $26^{\circ} 33'$ and long. $149^{\circ} 2'$. This he named "Fitzroy Downs." Beyond this range a river was discovered flowing to the S.W., fully as large as the Darling; it was called by the natives Maranoa; and was afterwards found, as well as the Balonne, to join the Darling. From hence Sir T. Mitchell traced the Maranoa upwards to a chain of mountains with volcanic summits; passing between these and a higher range towards the coast, he at length reached another chain of mountains extending westward, about the 25th parallel of latitude. A difficult sandstone country succeeded; on emerging from its ravines, a river, the Belyando, was struck, flowing, when first seen, to the N.W. The expedition encamped on it, in lat. $24^{\circ} 0'$, and long. $147^{\circ} 17'$. After following its course as far N. as $21^{\circ} 30'$, it turned to the N.E., and was recognised as the river "Cape" of Leichhardt.

Hence the party retraced their steps to the camp in lat. $24^{\circ} 30'$. The syphon-barometer gave the mean height above the sea of the range crossed in lat. 25° as exceeding 2000 feet.

Starting afresh from this camp, Sir T. Mitchell reached a gap in the westerly range, in lat. $24^{\circ} 50'$, and long. $146^{\circ} 42'$. On ascending the range he saw open downs and plains, with a line of river in the midst, 'extending to the N.N.W., as far as the horizon. He pursued the course of this river during ten successive days, the furthest point which he reached being in lat. $24^{\circ} 14'$, and long. $144^{\circ} 34'$. Here from a rising ground he could trace its downward course far to the northward. A range, showing sandstone cliffs, appeared to the southward, in about lat. $24^{\circ} 30'$, and long. $145^{\circ} 0'$. Sir T. Mitchell describes the whole of this country as the best watered portion of Australia that he had seen. New birds and new plants mark this out as a region different from any previously explored.* He feels convinced that the estuary of this river is in the Gulf of Carpentaria; and, at all events, that the country is open and well watered for a route thereto.

From this point Sir Thomas was obliged to return; and his account of his journey was forwarded from the dépôt on the Darling, from which he originally started.

This journey is not only exceedingly interesting in itself, but, considered in connexion with those of Sturt and Leichhardt, completes our knowledge of the general physical features of the S.E. portion of Australia, which may now be considered as one great basin, watered by the Darling and the Murray, and their numerous tributaries, all rising in the eastern or coast range; while the western side is a desolate country, of lower elevation, deprived, so far as we know, of any running streams. We are happy to learn that that able geographer Mr. John Arrow-smith is preparing a new map of this country on a large scale.

EUROPE.

France.—M. Vivien de St. Martin has published the fifth series of his 'Nouvelles Annales des Voyages;' and the same indefatigable author has also given to the world his 'Recherches sur les Populations du Caucase.'

M. J. J. Nicolas Huot has rendered an important service to our science by a translation into French of Pomponius Mela's work, 'De Situ Orbis.' The translation is enriched with numerous notes, while many obscure passages in the text have been elucidated.

We are happy to see, by the 'Bulletin de la Société de Géographie de Paris,' that attention is being awakened to the important subject of

* The natives were few and inoffensive.

geographical orthography. The advantage of uniformity in the spelling of the names of places must be evident to all, and this advantage is still further enhanced by attention to proper orthography. Of all the various ways in which a name may be written, there can be but one that is correct, and the discovery and adoption of this one is certainly an object to which, as geographers, we cannot be indifferent.

The Abbé Roudon has addressed a memoir to the Academy of Sciences of Paris on the determination of a fixed first meridian, but we have not learnt the result.

Spain.—From our corresponding member Don Jose d'Urcullu we learn, that the principal master of the Museum of Engineers at Madrid has published models of Teneriffe and Villa Franca di Nisa, made by himself.

The Geographical Dictionary of Madoz, mentioned in my Address of last year, is proceeding steadily: four volumes are already published, and the fifth is in the press. The work is to consist of 18 volumes.

The great map of Majorca, in 4 sheets, illustrated with views of Palma and some other towns, was to be published on the 30th of April.

Italy.—A large map of Italy, on a scale of $\frac{1}{1,000,000}$, is in the course of execution, under the direction of the Imperial Military Institute of Vienna. In this map Rome constitutes the meridian.

A map of Italy, in 28 sheets, on a scale of $\frac{1}{1,000,000}$, has just been completed by the Messrs. Civalli, of Milan, who have dedicated the work to the Chevalier Adrien de Balbi.

Captain Arregoni has also published at Milan, remarkable alike for its correctness and the beauty of its execution, a map entitled 'Carta Postale dell' Italia dietro i migliori materiali.' At Parma, a general map of Italy, in 6 sheets, by Captain Azzi, has been published; and one of Pisanía, by the engraver Piazzini.

Milan.—At Milan have appeared some works mediately and immediately connected with geographical inquiry; of these we would more particularly refer to the 'Dizionario Corografie Universale dell' Italia,' a work the production of some Italian *savans*, and of which several parts have already appeared—of Lombardy and the Duchy of Parma; and also the 'Miscellanea Italiana,' a collection of original memoirs on geography and statistics, from the pen of M. Adrien de Balbi, and revised by the son of the author, M. Eugène de Balbi. We may also notice the 'Topografia Storica di Milano,' and a work entitled 'Notizie Naturali e Civili pello Lombardia.'

Zara.—An important publication by Mr. Carrara, under the title 'La Dalmazia Descritta,' has been published in Italian, in which we

find a clear and lucid exposition of the physical and political geography of Zara.

Turin.—The Superior Commission for Statistics has published a volume on Sardinia, and also one on the subject of criminal statistics. The Geographical, Statistical, and Commercial Dictionary, of Mr. Cassolis and his coadjutor Mr. Anguis, is continued, and its publication appears from time to time; as do also the Topographical and Statistical Works of Captain de Bartolommeij and Mr. Dho.

Sardinia.—Major-General Ferraro di Marmora has published a map of Sardinia, on the scale of 1:100,000.

Florence.—At Florence geographical inquiries and studies are prosecuted with much earnestness. The publication of the work 'Corografo dell' Italia,' forming 18 volumes 8vo., with an Atlas of 144 maps and 260 illustrations, is just completed. Repetti's 'Dizionario Geografico Fisico Storico della Toscana,' with a Supplement, forming the sixteenth volume of this remarkable work, has recently been brought to a close.

Mr. Salvaguoli Marshatti, Medical Inspector of Grossetto, has published a 'Memorie Economico Statistiche sulle Marzemme Toscane,' a work abounding in statistical details of an important character, relating to that portion of Italy heretofore but little known. The publication of the volume entitled 'Geografia Politica dell' Italia,' by Mr. Biouelis, is being continued; as is the work by Mr. Marmoulie, the 'Podromo della Storia Naturale generale e comparata d' Italia.'

Naples.—General Visconti informs us that, during the past year (1846), the field operations of the Engineers of the Topographical Office were greatly obstructed by the great dryness of the season, which kept the mountains of Calabria, as seen from the island of Stromboli, hidden in continual clouds, so that the triangulation of the first order along the meridian from Termoli to Cape Passaro could not be carried on, and they were only able to determine some secondary points in Calabria.

In the present year, requiring some geodetic points for the Map of the Kingdom, on the scale of 1:100,000, towards the frontier, it has been found necessary to employ the whole of the operators in determining points of the second and third order toward that frontier; deferring the operations on the arc of the meridian till they can be resumed with a greater force of persons and instruments. The triangulations of the second and third order advanced during 1846 considerably towards the northern frontier, and to the N. of Lake Fucino. The delineation of Lake Fucino is completed, as well as that of the country that summits

it, as far as the parallel which passes about a mile to the S. of Monte Velino. The topography of the country surrounding Naples has been revised, in order to add all the details of the ground which had not been inserted when the plan was originally drawn—that is, before 1820.

With regard to the internal labours of the office, much progress has been made in engraving the great Map of the Kingdom on the scale of $\frac{1}{100,000}$: the statistical and road map of the kingdom, on the scale of $\frac{1}{200,000}$, commenced two years since, is also much advanced. Some plans of the collection of Ports of the Mediterranean for the use of the Royal Navy, are also engraved.

Orography.—The frequent eruptions of Mount Vesuvius must necessarily produce variations in the height of the borders of its crater, and, accordingly, M. Elie de Beaumont, in a letter to our countryman Mr. Pentland, has expressed the desire that the height of Punta del Palo be very exactly measured every year, or at least once in ten years. On this subject M. Cangiano has written to M. Elie de Beaumont, stating the mode by which this admeasurement may be best effected. It would appear that the Punta, measured by M. Amanti on the 27th February, 1846, was 1203 metres above the sea; and that the burning cone was then 9·5 metres lower than it; but that, measured again on the 31st March, the latter had risen 2·7 metres.

Naples.—Of the various publications which have recently appeared at Naples, we may allude to that by Mr. Salvatore di Renzi, under the name of '*La Topografia e Statistica Medica della Città di Napoli*,' not confined to statistical details of that city only, but embracing also many scientific and learned considerations relative to the whole kingdom of the Two Sicilies.

Austria.—At Vienna is being prepared, by the Imperial Military Geographical Institution, a general Map of Tuscany and of the Papal States, on a scale of $\frac{1}{100,000}$; being a continuation of those heretofore published of Venetian Lombardy, and the Duchies of Parma and Modena.

Under the same authority has been recently published, the result of the trigonometrical operations executed by Marieni in the years 1841, 1842, and 1843, in which will be found many important new altitudes, which were previously wanting in the orography of Italy.

Russia.—Sir Roderick I. Murchison has received a communication from Admiral Lütke, of an intended Russian expedition of discovery along the Uralian chain, being the first enterprise of the Imperial Geographical Society of St. Petersburg, a Society founded on the

model of the Royal Geographical Society of London. Colonel Hoffmann (the companion of Colonel Helmersen in his Siberian tours) is the chief of the expedition, and is already on his way to Perm, accompanied by M. Kowalsky as astronomer. At Perm he will be joined by M. Strajefsky, the previous explorer of that part of the chain N. of Bogoslofsk, who will act as second in command. Branth, the faithful companion of Middendorff, is the naturalist of the expedition.

This summer will be passed in reaching the 65° N. lat., the parallel previously attained on the Asiatic side by the labours of Strajefsky; and, in the ensuing year, it is hoped that the glacial sea will be reached.

Finland.—M. Leozon de Luc, who has published a work on Finland, proposes going again to that country, and asks instructions of the Academy of Sciences of Paris.

AFRICA.

M. Rochet d'Hericourt, whose first travels in Abyssinia, in 1839 and 1840, you are already acquainted with, has just published the account of his second visit to the same country; he had already, as I stated in my last Anniversary Address, furnished the Geographical Society of Paris with some of the results of his second voyage. The whole of his late labours have now been submitted to the examination of a Committee of the French Academy of Sciences.

M. Rochet had embarked from Marseilles in January, 1842, and returned at the end of 1845. The report of the Academy is very favourable to M. Rochet's exertions.

He has taken the respective bearings of leading positions from the points already determined, and made a considerable number of meteorological observations, not only at Angobar and Angolala, but also at Kosseir and at Moka. The magnetic declination was also observed by him at Malta, at Alexandria, at Cairo, at Denderah, at Kosseir, at Djidda, at Mokha, at Ambabo, at Ganbadi, at Angolala, and at Ankobar.

The geology of the country through which he passed has not been neglected by the traveller, who has likewise collected many plants, some of which are new.

The tides of the Red Sea were observed by M. Rochet, whenever he had an opportunity, and it appears from his observations that the mean diurnal variation at Moka, on the N. of the Strait of Babel Mandeb is 0·6 metre; but that it is much greater at Ambabo, to the S. of the strait. M. Rochet's narrative contains, moreover, some interesting

details on the character, manners, and religion of the people of those parts of Abyssinia visited by him ; and, on the whole, whether as confirmatory of the statements of other travellers who have lately explored that part of Africa, or as supplying fresh matter, is a most welcome addition to our knowledge of Abyssinia.

We sincerely regret to learn that no accounts have been received of *M. D'Abbadie* since early in 1845 ; nevertheless, his friends are sanguine of his return, attributing the absence of all communications rather to the difficulty of forwarding them than to any personal disaster. We trust that these opinions may be realized in his safe return.

On the dark side of the picture of geographical research, we lament to place the assassination of *M. Maizan*, an officer of the French navy, who has fallen a sacrifice to native jealousy or native cupidity. This young and zealous officer purposed proceeding direct into the interior of the country bordering the Zanzibar ; he had made considerable progress, when the too murderous blows of the assassin terminated at once his discoveries and his life. Of *M. Kraff* also we regret to learn that very serious fears are entertained lest he have shared a similar fate.

M. Raffanel, whose exploration of the River Falúné, and of the gold-mines of Keniébé, in Senegambia, in the years 1843-44, was mentioned in my predecessor's anniversary address for 1845, has undertaken the very difficult and hazardous task of exploring the African continent in its greatest breadth, from W. to E., between the parallels of 10° and 15° N. ; and the French Academy of Sciences, ever ready to further the views of adventurous travellers for the benefit of science, have furnished *M. Raffanel* with all the necessary instructions for his researches. The general questions supplied to him have been drawn up by *M. Freycinet*, and special questions by the indefatigable *M. Jomard*, besides particular instructions on various subjects by other *savans*. Thus the means have been afforded him of acquiring valuable information on the historical traditions of the people and their government, their manners, customs, laws and religion, and their industry : on the soil, the geological formation, the productions of the country and its climate. The study of the winds has been particularly recommended to him, and the desirableness of ascertaining, if possible, whether the W. wind which blows from the Atlantic a little to the N. of the Equator be due to the rarification of the air over the African continent pointed out : as also whether it be true, as affirmed, that in the latitudes he is about to traverse the wind from the S. be hot, in which case it is probable that no high mountains lie in that direction ;

or that if they do, they are further removed than the position of 10° , in which a chain is laid down on the maps. The traveller's attention has also been called to the importance of meteorological observations generally, and to the advantage that would accrue from hourly readings of the thermometer and barometer, at different stations on his route, and the method pointed out by Boussinghault for ascertaining the mean annual temperature of any place particularly recommended to him, as well as the observation of maxima and minima temperatures. Observations for lat. and long. have been properly stated as most desirable, there being on the line of his journey but three points ascertained, viz., Sakkatou, Aussa, and Kobe, in Darfour: the magnetic variations will also be observed. With the detailed instructions thus supplied to him by the Academy of Sciences, and in possession of various inedited memoirs and itineraries of parts of the country he is about to explore, furnished with the more essential instruments, and gifted with the necessary moral qualifications, and already acclimated, and experienced in dealing with the natives; there is every reason to hope that M. Raffenel's exploration will produce important results to geography and to science in general: he assuredly has our best wishes for his safety and success.

It is also reported that four Italians (missionaries) are about to explore simultaneously, but by different routes, the central parts of continental Africa, throughout the large space comprised between the Sahara and the Congo, the Senegal and Abyssinia. This combined exploration is said to have been a favourite project with Gregory XVI., and the present pope appears to enter on the plan of his predecessor with much goodwill.

Madagascar.—The projected voyage of M. Leguillon to Madagascar, we understand, is not to take place; and the instructions which had been drawn up for the traveller have been sent to the governor of the Isle of Bourbon, to be given by him to such surgeons of the French navy as may have an opportunity of exploring in Madagascar.

AMERICA.

United States.—The report of the Secretary of the Treasury affords us information of the progress made during the last year in the surveys of the line of coast. His report embraces the operations of the different surveying parties in the field, and the office work, including computations, drawing, engraving, and publishing of maps and charts. The plan on which the work has proceeded during the past two years,

contemplates the survey, at one and the same time, of different sections of the coast, and the publication of the resulting maps. Thus in 1844-45, the triangulation was begun in North Carolina, and a reconnoissance made on the Gulf of Mexico, from Mobile Bay westward and eastward. At the same time the work was vigorously prosecuted in the eastern section, and in the Chesapeake section, and unfinished parts were completed on the coast between Point Judith and the Capes of the Delaware.

In 1845-6 the operations on the Chesapeake have been resumed, the number of parties in North Carolina increased, and the triangulation on the Gulf of Mexico commenced. The reconnoissance of the coast of South Carolina, Georgia, and the coast of Texas, has been ordered. The discovery of the New South Shoal off Nantucket is important, lying six miles S. of any known danger, in the usual track of vessels between New York and Europe, out of sight of land, unmarked and unknown except to the lost.

From these surveys, it appears that the line of coast has been much under estimated hitherto. It is now proposed to divide the whole extent of shore-line into nine sections, by which arrangement the survey may be completed within a limited period; in 1847-48 six of these sections will be in full activity. During the past year fourteen surveying parties have been employed in fourteen States, but the existing hostilities between the United States and Mexico have been productive of delay and interruption, from the withdrawal of all the officers of the line for military service.

The magnetic telegraph has been used to ascertain the differences of longitude between the Washington and Philadelphia observatories, as an introduction to operations on a large scale.

Charts of New Bedford and Annapolis Harbours have been published; also the chart of Fisher's Island Sound, and the middle sheet of Delaware Bay and River; the chart of Little Egg Harbour, and a sketch of the newly discovered South Shoal off Nantucket. A chart of New Haven Harbour is stated to be ready for printing. The charts of New London and Syopet Harbours are nearly engraved.

The labours of the hydrographic party have been rewarded by the discovery of a shoal to the southward of that known as the Nantucket South Shoal; and of a shoal spot in the Vineyard Sound, where it was supposed there was deep water. These discoveries are important services to the intercourse between Europe and the United States, the dangers brought to our knowledge lying, as it were, in the very highway of each.

West Indies.—The West Indian Archipelago, and the Island of Guadaloupe in particular, has been minutely examined by a French traveller, M. Charles Deville, who was witness, at the latter island, of the earthquake of the 8th of February, 1843, the most disastrous with which it has ever been afflicted. He has correctly surveyed the southern and most difficult portion of the island, and has corrected the configuration and relative position of some of the other islands. He has determined the heights of 150 points in Guadaloupe, and found, from a mean of many observations, that the highest peak is 1484 metres above the sea. It may be here stated, that M. Deville, having made an excursion to Teneriffe, to the Cape Verde Islands and Barbadoes, observed in the first of these islands the height of its peak, to which he gives 3706 metres—the mean of six other observers being 3702. At Trinidad, Porto Rico, St. Thomas, and Guadaloupe, very numerous and very exact meteorological observations were made, the results of which, said to be of the greatest interest, will no doubt be published. In the West India Islands, the temperature of their rivers, lakes, and springs has been carefully observed, as also the temperature of the sea around them and of the ocean, in his trip to and from Teneriffe. The high temperature of the ocean, observed by M. Deville, between Guadaloupe and Bermuda, is a new fact in science. M. Deville has also confirmed the fact of the difference, all reductions made, in the indications of the barometer at the level of the sea at different places, and corroborated the curious results arrived at by Erman on this subject. Terrestrial magnetism and geology have also, particularly the latter, been carefully observed by M. Deville, whose work will no doubt be one of very great interest.

Central America.—Mr. M. Hurtado has taken his departure for the Isthmus of Panama, where he intends making observations on Physical Geography, being supplied for that purpose with instructions from the Paris Academy of Sciences.

North America.—M. Morelet is travelling in Mexico and the neighbouring countries, as a naturalist and antiquarian; and, as he has been supplied with both general and special instructions, it is hoped he will glean much interesting and valuable information.

South America.—M. Castelnau, we learn, has sent home from Lima, and still more recently from Cuzco, some information respecting the countries he has visited, and procured a complete list of all the earthquakes which have been felt in that city from 1820 to 1846.

M. Castelnau has also addressed to the French Minister of Public Instruction a report of his expedition from Cuyaba to the frontier of

Paraguay. His route lay through a country almost unknown to Europeans. Leaving Paraguay, he entered the great Lake Gaïva, a bay said, by the natives, to communicate with the Uberava. This river M. Castelnau proposes to name Rio Pedro II. in honour of the emperor. The best maps, the writer states, mark not fewer than four or five imaginary rivers.

M. Castelnau proposed returning from Cuzco by the route of the rivers Apurimac and Ucayale to the Amazons, which he would descend to Para, and thence proceed to Cayenne.

The exploratory expedition of the Amazons, which was to have been executed under the direction of M. Tardy de Montravel, has been postponed, as appears from a communication made by the Minister of Marine to the Académie of Sciences, in the beginning of last January.

Other French travellers are preparing to explore different portions of the continent of South America. M. Hellert proceeds to the isthmus of Darien; M. Morelet is about to examine the natural history of Guatemala; M. d'Anet will explore the interior of Brazil; and M. de Marcey has lately quitted the region of Paraguay to descend into the Pampas and the solitudes of the Rio Negro.

FOREIGN CORRESPONDENTS.

ASIA.

We have been favoured by M. Biot with a communication, from which we regret to learn that his valuable labours, as regards the publication of the second portion of his Essay, have been for a time suspended, in consequence of domestic bereavement. Of the former part of this Essay, you will find some particulars in my Address of last year.

China.—Mr. Stanislaus Julien has produced a most valuable translation of the Chinese description of the province of Ili, which, though probably somewhat dry, and but little attractive to the general reader, yet contains important scientific facts, and is the more valuable as enabling us to add to or correct the maps of Central Asia, published some time since by M. Klaproth. It is, we are happy to hear, the intention of Mr. Stanislaus Julien to continue his labours, and to translate many other descriptions of provinces connected with the, so-called, Celestial Empire. He purposes also to make us acquainted with the account of certain expeditions undertaken by the Chinese in Central Asia, thus rendering to geographical science and discovery

very valuable service, by making us more intimately acquainted with the interior of a vast country hitherto nearly closed from our inspection.

M. Schrenck, a Russian voyager, has made some very interesting excursions towards the frontiers of Central Asia, visiting the countries in the vicinity of the lakes Balkach and Alactougoul. The particulars of these excursions have been published at Petersburg, by M. Baer.

Hong Kong.—A map of this island, on the contour principle, giving the heights at every 100 feet, has been completed by the officers of the Royal Engineers.

Historical Geography.—For a long time past, two of our most valued foreign members, each with an ardent desire for truth, but each very naturally anxious to find in favour of his own country,—the Viscount de Santarem and M. Détreval, have been at issue on the subject of priority of discovery between the Portuguese and French navigators to the south of Cape Bojador. The honourable zeal and the extensive researches of the disputants command our admiration; and without venturing to pronounce in favour of either, we cheerfully acknowledge our obligations to both for the mass of curious facts which they have severally collected in support of their views, and which is all so much valuable addition to historical geography.

Subjects cognate to Geography.—M. Grange, it appears from the ‘Comptes Rendus,’ has printed, though not published, a memoir, entitled ‘Recherches sur les Glaciers, les Glaces flottantes, les Dépôts Erratiques, sur l’Influence des Climats, sur la Distribution Géographique et la Limite inférieure des Neiges perpétuelles, et études du phénomène erratique du Nord de l’Europe.’ The matters thus treated of by M. Grange are not only highly interesting in themselves, but constitute some of the most important problems of physical geography.

To the same department of our science belongs also a memoir of M. Alexis Perry on earthquakes; by which it appears, that in 1845 there were no less than fifty felt in Europe, distributed equally over the seasons, though it was previously believed that the autumn and the winter were the seasons most subject to them.

The ‘Comptes Rendus,’ 25th May, 1846, contains a memoir by M. Dureau de la Malle, tending to establish, in opposition to the work of Dr. Fuster, that the climate of France has not changed in modern times. M. Dureau de la Malle intends to follow up the subject by a memoir on the Ancient and Modern Climatology of Italy. In the number of the 15th of June, however, will be found Dr. Fuster’s answer to M. Dureau de la Malle,—and in the number for 29th June,

p. 1080, M. Dureau de la Malle's rejoinder;—last reply of Dr. Fuster, 10th August, p. 299.

The geographical distribution of plants, a branch of our science raised into its well merited importance by the labours of Humboldt, Wahlenberg, R. Brown, Schow, de Mirbel, de Candolle, de St. Hilaire, Martius, &c., who have laid down its laws, is entitled to the best attention of those who have a just appreciation of the vast range of intimately connected subjects implied by the general term Geography;—it is accordingly my duty in the present address, to point out where any additional information on the geography of plants may be found. I will therefore state, that in the '*Comptes Rendus*' of the Academy of Sciences of Paris, of the 29th June, 1846, you will see the very interesting report on a valuable memoir by M. Ch. Martius, entitled an '*Essay on the Climate and Vegetation of the Northern Estuary of Norway.*'

MISCELLANEA.

An historical sketch by Mr. Francis Dutton, a resident in South Australia, and having a considerable stake in the well doing and prosperity of that important colony. This work gives an account of the discovery of the vast mineral treasures of South Australia, which, though declared to exist, by Menge, a German, were accidentally discovered by the youngest son of Captain Bagot, whilst gathering flowers, and subsequently by the author.

The topography of the harbours of Athens, by the late Professor Ulrichs, a small, but interesting treatise, has been translated from the modern Greek by Mr. E. Pye Colquhoun.

A dissertation on the knowledge of the Passes of the Alps possessed by the Roman historians, under the title of '*Some Remarks on the Alpine Passes of Strabo,*' has been printed by a member of our Society, W. J. Law, Esq.

A second volume of Humboldt's '*Kosmos*' has appeared since my last address, but not having yet appeared in an authorized English form, I am obliged to content myself with the bare announcement.

Our learned honorary member, the Chevalier Balbi, has published his "*Essay upon the Population of Portugal from the Time of the Romans to the present date.*" After stating the great diversity in the accounts of former writers, caused by the deficiency of accurate data, he proceeds to show that the population, which by the census of the Emperor Augustus amounted to 2,841,000, had decreased in 1580 to 1,000,000, after which it increased regularly up to the year 1807, when it reached

3,199,000. The war with France, and the emigration of the royal family to Brazil, caused a diminution, so that, according to Colonel Franzini, it was reduced on the 1st of January, 1815, to 2,959,000, since which date it has gradually recovered, till in 1841 it amounted to 3,460,000.

Atlases.—I have in my last year's address called your attention to the very beautiful and improved edition of Berghaus' Physical Atlas of Mr. Alexander K. Johnston, of Edinburgh, which is now drawing to a conclusion, and which, but for the extraordinary demand made by the proprietors of railways on draughtsmen and engravers generally, would have been completed by this time. Of the ten numbers promised, have already appeared; and the work will, in all probability, be finished by the end of the year. The execution of these maps is beyond all praise; and while the atlas reflects honour on the skill and ability of the enterprising publisher, it is admirably calculated for calling attention to that most interesting and important object, physical geography, to the study of which I must again invite all who would derive from our science all the delight and the practical benefits it is competent to yield.

Within the last few weeks Mr. Betts has published an atlas containing some new features, and rendered extremely valuable by a most copious index, comprising nearly 60,000 names of places. In addition to the longitudes and latitudes usually given, there is an arrangement of letters round the margin of the maps, by referring to which the situation of any required place can easily be learnt. We must, however, observe that this arrangement of marginal letters is not now introduced for the first time, as Captain Mangles, R.N., a member of this Society, had some years since brought forward a similar mode of easy reference. Several entirely new maps of India, Canada, Polynesia, &c. are introduced.

An atlas has just been announced by Mr. John Sharpe, which we notice in consequence of a peculiarity that is undoubtedly a step in the right direction. While in every atlas with which we are acquainted there are as many scales as maps,—in the present atlas, consisting of between 50 and 60 maps, the number of different scales is reduced to four, which are denominated Continental, Intermediate, Divisional, and Enlarged. The Continental, which is the smallest of the four scales, comprises 45 by 60 equatorial degrees; the Intermediate are twice this size, or 22½ by 30 degrees; the Divisional, five times the Continental, or 9 by 12 degrees; and the Enlarged, fifteen times the Continental, or 3 by 4 degrees. By this arrangement both

the linear dimensions and the superficial extent of countries may be compared with facility and dispatch. A greater uniformity of scales than generally prevails among our map-makers is very desirable on many accounts; one of the most obvious disadvantages of a great variety of scales is the great time that is lost in seeking for a place whose approximate distance from some capital or principal town is known, but the eye being unaccustomed to the scale, much time is lost in seeking for it. It is, however, but fair to notice that it is not so much the map-makers as the publishers who employ them that are to blame. The representations of the map-maker are frequently unheeded, because the maps must be made to a given size, and thus the advantage of the science is sacrificed to the convenience of the publisher.

Conclusion.—Permit me, in conclusion, to advert for a moment to the present state and future prospects of the Society. The Report of the Council has so fully detailed the financial reforms which it has adopted since the last anniversary, and which you have now confirmed, that I will only add my own conviction that, if fully carried out, the Society will be entirely relieved from the fear of any deficiency in the means of meeting its ordinary expenses, without any decrease in the efficiency of its operations, except a reduction in the size of the Journal, which we may hope will only be temporary, and that increasing funds will soon enable the Council to restore it to its former bulk. It would doubtless be very desirable to possess more commodious apartments for holding our continually increasing collection of books and maps, but I fear we must not at present look for any assistance towards this object beyond our own Society; and the researches of the Council during the past winter have shown that any removal to more desirable apartments can only be effected at an increased annual expense. We must trust, therefore, to our own exertions; and now that past differences of opinion have subsided, let us hope that our prospects will continue to brighten, and that under the guidance of the able and distinguished geographer whom you have this day elected to fill the chair of the President, the Geographical Society will again increase the number of its members, and extend the sphere of its public utility.

ACCESSIONS TO THE LIBRARY.

TO 25TH MAY, 1847.

EUROPE.

<i>Titles of Books.</i>	<i>Donors.</i>
ALPS.—Some Remarks on the Alpine Passes of Strabo. By W. J. Law. 8vo. 1846	W. J. LAW, Esq.
L'AUSTRIA e le Primarie Potenze Saggi di Statistica comparativa di Adriano Balbi. 8vo. Milan, 1846	Chevalier ADRIAN DE BALBI.
GREECE.—Travels in Lycia, Milyas, and the Cibyratis, in company with the late E. T. Daniell. By Lieut. T. A. B. Spratt, R.N., and Professor Forbes. 2 vols. 8vo. 1847	Lieut. SPRATT, R.N.
——— Topography of the Harbours and Position of the Long Walls of Athens. By H. N. Ulrichs. Translated from the modern Greek by E. P. Colquhoun. 8vo. pamphlet. 1847	E. P. COLQUHOUN, Esq.
RUSSIA.—Geognostische Bemerkungen über die Steppengegend zwischen den Flüssen Samara, Wolga, Ural und Mанычс gesammelt auf einer reise in Jahre 1843, von A. Noeschel Bearbeitet und mit Anmerkungen und Zusätzen versehen von G. Von Helmersen. 8vo. pamphlet. 1846	Colonel VON HELMERSEN.
——— Ueber den Flächeninhalt der 37 Westlichen Gouvernements und Provinzen des Europäischen Russlands. Von F. G. W. Struve. 4to. St. Petersburg. 1845	M. STRUVE.
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Page.

- 304, and throughout, *for* Singapúr, *read* Singapore. The ancient and present Malay name is Singapúrá; the English name is Singapore.
- ,, and throughout, *for* bangala, *read* bungalow.
- ,, ,, *for* Lagan, *read* Logan.
- 305, ,, *for* Carabee, *read* Carnbees.
- 306, ,, *for* Tenjong, *read* Tanjong.
- 307, ,, *for* putib, *read* putih.
- 309, *delete* granitic.
- ,, *for* Tanjong, *read* the Tanjong.
- ,, *for* distinctly defined, *read* obliterated.
- 310, *for* inland rivers, *read* inland views.
- ,, *for* president, *read* resident.
- 313, *for* Rumbowi, *read* Rumbow.
- 314, *for* Riman, *read* Rimaú.
- ,, *for* Lepa, *read* Lépa.
- ,, *for* Batu Bayas, *read* Búket Báýá.
- ,, *for* Batu Birtam, *read* Búket Birtám.
- 315, and throughout, *for* Wellesley Province, *read* Province Wellesley. The former name has long been in desuetude.
- ,, *for* Aser Etam, *read* Ayer Etam.
- ,, *for* Glufor, *read* Glugor.
- ,, *for* Paxe, *read* Prye.
- 316, *for* sufficient, *read* deficient.
- ,, *for* Sange, *read* Súngai.
- 317, *for* Puz, *read* Prye.
- ,, *for* Chemkal, *read* Chunkol.
- 321, *for* Tuwan Allah, *read* Túán Alláh.
- ,, *for* Mandrah, *read* Manoráh.
- 327, *for* I had detached masses, *read* I had observed detached masses.
- 329, *for* I believe this is the first instance of granite rocks near the shore observed so close to the Equinoctial Line, *read* I believe this is the first time grooved rocks have been observed so close upon the Line.
- 330, *for* elementary, *read* elevatory.
- By omitting fig. 1 of the sketches of the Pulo Ubin grooved granite-rocks, the description in the text has been rendered erroneous.

Map of the
COUNTRIES SOUTH OF ABESS

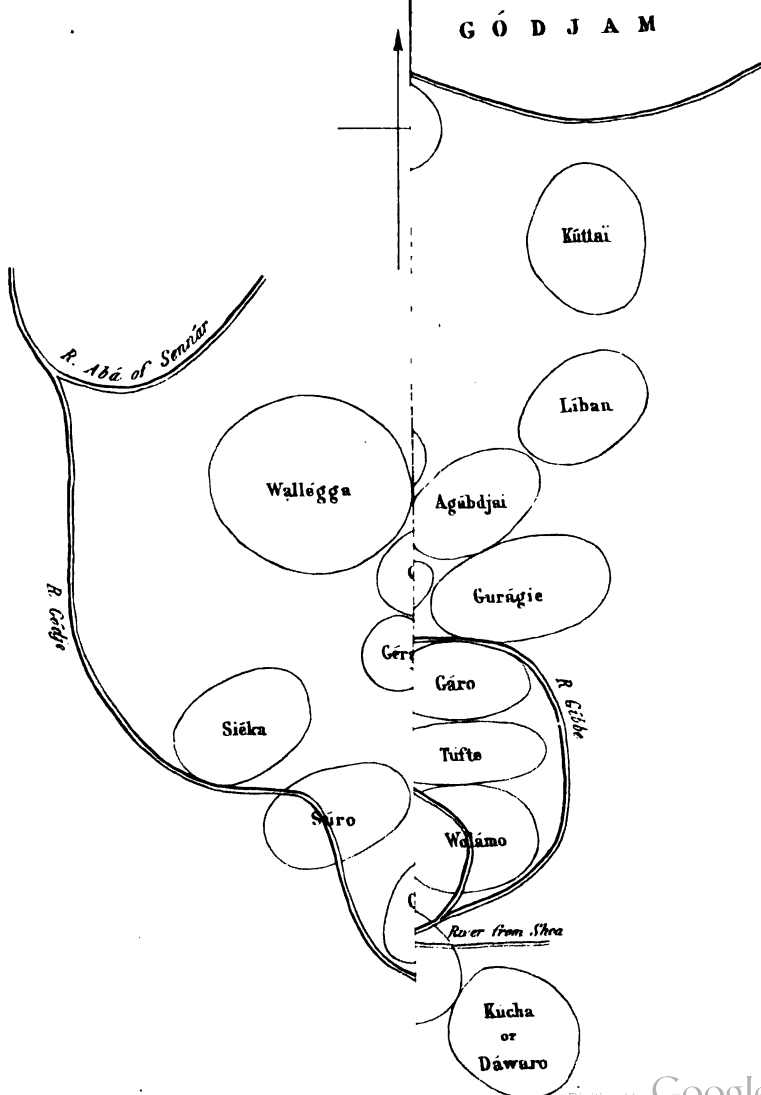
drawn under the Dictation of

'Omar ibn Nedjât

by

D^r BEKE.

Ygübbi, 2th February 1863.



PAPERS READ

BEFORE THE

ROYAL GEOGRAPHICAL SOCIETY.

I.—*On the Nile and its Tributaries.* By CHARLES T. BEKE, Esq., Ph. D., F.S.A., F.R.G.S., Corresponding Member of the Geographical Society of Paris.

NOTWITHSTANDING all that has been effected during the last few years in the way of acquiring a knowledge of the upper basin of the Nile, the position of the source of that celebrated river remains as unknown as it was in the earliest ages: the saying of the ancients, *Nili quærere caput*, continues as applicable at the present day as it was when first used to denote the impracticability of any undertaking.

Still, the want of success which has hitherto attended the attempts to discover the head of the Nile, instead of discouraging, ought rather to incite us to more arduous endeavours. If the birth-place of the giant-stream of Africa has not yet been detected, we are at least in a better condition than ever before to decide where it is *not*. In this, as in most other questions of research, it is by a long and tedious journey round a spiral, with the face never directed in a straight line towards the centre, that that point is at length attained; and it is only by the consciousness, that, as the folds of the spiral become more and more contracted, all that is untrue is left on the outside, that we are encouraged to persevere in our course till at length we reach the goal.

The last few years have been most fruitful in results bearing upon our knowledge of this interesting subject. The expeditions undertaken by command of the Páshá of Egypt on the one hand, and the explorations of the numerous travellers who have entered Africa from the eastern coast on the other, have supplied rich materials for the history of the upper basin of the Nile. We have on many points acquired certainty, where before all was doubt and speculation; and the vantage-ground thus gained affords us a sure and firm footing for the prosecution of further labours.

As an aid towards the solution of this important geographical problem, it is proposed in the present Essay to take a general survey of the numerous streams which unite to form the river of Egypt, so far as our knowledge of them extends. In the performance of this task we shall confine ourselves as much as

possible to the actual results which have been obtained by the various travellers who have visited the countries watered by those streams. That speculation must still, at times, come in aid of facts is unavoidable; but it will be our endeavour to confine this speculation within legitimate bounds, and to limit it, indeed, to the reconciling of seemingly contradictory statements and to the arranging and combining of isolated and unconnected facts, where actual information is still insufficient and unsatisfactory. To say that we shall, on all points, come to definite results, is more than is warranted by the imperfect nature of the premises.

The usual and most methodical mode of describing a river is to commence at its source, and to follow its course down the entire stream, noting its various tributaries as they consecutively join it. This method is, however, forbidden to us in the case of the Nile; for its head is still enveloped in the clouds of mystery which have in all ages concealed it from our sight. The next best method is to reverse the process and to ascend the river, enumerating its various tributaries as they, from time to time, fall into it. When we come to a fork of the principal stream, each arm of the fork must be considered separately, and its affluents noticed in the same manner as in the case of the main stream itself.

It is this latter process which must be adopted with respect to the Nile. And the right or eastern bank of that river being the more accessible, and consequently the better known to us, is naturally first entitled to our consideration.

For a distance of upwards of 1200 geographical miles from the Mediterranean, into which it discharges its waters, this mighty river, the largest in the continent of Africa, and one that is probably unsurpassed in length by any on the entire surface of the globe, is a *single* stream. Fed by the incessant rains of the tropics, which are collected by its innumerable head-streams in the south, it is enabled to contend with the burning sun and the scarcely less burning sands of Nubia and Egypt throughout this great extent of country, without the aid of a single tributary; presenting a phenomenon which finds its parallel in no other river.

In about 18° N. lat., at the northern limit of the tropical rains, the Nile receives on its right bank its first great affluent, the Atbarah—the Astaboras of Ptolemy. This river bears also the name of El Mokádah, as coming from Abessinia,* and at its

* Mokádah, Makádah, or Mekyádeh, is the name by which the entire hill-country of Abessinia and the Gállas is known among the inhabitants of the lower districts of Atbarah and Sennár. By the Arabs this country is called *Habesh*. But, in order to prevent misconception, it should be remarked that they apply this name not merely to the *Abessinia* of European geographers and travellers, but generally to the elevated range of table-land of Eastern Africa—the country which, as producing slaves of a character totally different from that of the Negroes, is by the Arab merchants and slave-dealers contradistinguished from the Belád el Sádán, or country of the *Blacks*. Thus, the

confluence with the Nile it is called El Mokrán.* It is further designated Baħr el A'swad, or the Black River,† from the quantity of black earth brought down by it during the rains, which is so great as even to affect the general colour of the Nile.‡ In Abessinia it is known as the Tákkazie. In the lower part of its course the bed of the Atbarah is from 400 to 500 paces in width, with but little water except during the rains, it being stagnant and not drinkable for three or four months in the year.§

At about 2 days' journey up its stream the Atbarah receives on its right bank a small tributary, having its rise in the Bisháriyeh mountains towards Suwákin,|| which is nearly dry in the summer, and appears to be nothing but a collection of wádís, or winter-torrents: To this stream Burckhardt attributes the name of Mogren, adding that below its junction with the Atbarah the latter assumes the name of its tributary.¶ Cailliaud asserts, on the contrary,** that the term *Mokrán* (Moqrân) signifies “confluence” or “junction,” and that there is no such river as that mentioned by Burckhardt. As, however, the French traveller admits that several *torrents* join the Atbarah, Burckhardt, whose accuracy as a recorder of facts is beyond dispute, must be understood as alluding to one of these torrents, even if it should happen that

slaves called “Hubehee” (Hâbashi) or “Abessinian” in Egypt, Arabia, and India, are not usually natives of *Abessinia*, in the ordinary acceptation of that term, but of the countries S. of the Abáí; and even those who are particularized in Abessinia and Egypt as “Enáreans,” come, in many cases, from countries still further to the S. and W., being called by that name because the slave-merchants of Abessinia purchase them in the markets of Enárea. See on this subject the ‘Friend of the African,’ vol. i. p. 15.

As regards the use of the form “Abessinia” instead of “Abyssinia,” it is justly observed by the Rev. C. W. Isenberg, in his ‘Abessinien und die evangelische Mission’ (12mo., Bonn, 1844), vol. i. p. 1, that “the spelling of the name of this country ‘Aby-

sinia’ is etymologically incorrect. For, from the Arabic حبش *Habesh*, we had first the Latin *Abassia*, from which *Abessinia* or *Abassinia* would naturally be formed, but not *Abyssinia*, which seems to point to the word ‘Abyss’ as its root, which it is not.” This erroneous mode of spelling the name is adopted by Dr. Johnson in his Translation of Father Jerome Lobo’s ‘Voyage to Abyssinia,’ published in 1735; but in his ‘Rasselas,’ published in 1759, four-and-twenty years later, he has “Abissinia.”

* Commonly pronounced Mokrán. Cailliaud, ‘Voyage à Meroé et au Fleuve Blanc,’ vol. iii. p. 176.

† ‘Narrative of the Expedition to Dongola and Sennaar, &c.,’ pp. 125, 197.

‡ Linant, in ‘Journal of the Royal Geographical Society,’ vol. ii. p. 185.

§ Cailliaud, vol. ii. p. 130, *sq.* Mr. English says (‘Narrative, &c.,’ p. 197), “I estimated it at about two-thirds of a mile at its embouchure.” This was during the rains.

|| Burckhardt, ‘Travels in Nubia,’ p. 373. [Suwákin, or Sawákin, signifies “Inhabitant.”—F. S.]

¶ I believe that our accomplished and worthy Secretary, Colonel Jackson, was the first to direct attention, in his valuable little manual ‘What to Observe’ (2nd edit. p. 17), to the circumstance of a river, below the confluence of two streams, being regarded by the inhabitants of the opposite banks as the continuation of the one or the other of those streams, as a not unfrequent cause of discrepancy in travellers’ accounts of countries little known. The necessity for this caution was never better exemplified than in the case of the Nile and its various tributaries.

** Vol. iii. p. 176.

he is mistaken with respect to its name; since it is clear, from his mention of it on several occasions, and from the fact of his having traced its course upwards nearly as far as Suwákin, that such a water-course actually exists.*

At the same time that Cailliaud denies the existence of the "Mogren," he states † that there is no tributary of the Atbarah except the Sitit, which joins that river 3 degrees (180 miles) above its junction with the Nile. M. Werne, ‡ on his way from Taka to Kóz-Rádjeb, § crossed a large water-course in about this situation, which he calls Khór el Gash, and which, though usually dry, was, at the time when he passed it (in the month of November, 1840), no less than *four thousand feet* in breadth, in consequence of the rains. On looking to the position attributed in our maps to the Máreb, which is made to run towards the Atbarah in about 16° N. lat., but without joining it, we should be led to the conclusion that that river is the upper course of the Sitit, or Khór el Gash. But from the relation of Dr. Petit, || the junction of the Máreb with the Atbarah, or Tákkazie, takes place considerably higher up—in fact, opposite to the province of Walkáit, in about 14° N. lat.; so that the Sitit must be a separate stream.

Proceeding up the right bank of the Tákkazie—as, in accordance with the native usage in Abessinia, the Atbarah will henceforward be designated—we next come to the Máreb. This river is generally supposed not to reach the Tákkazie, but to lose itself in the sands of an extensive marshy and woody district, named Bárakwa or "the Desert:" ¶ indeed, Dr. Rüppell goes so far as altogether to deny the existence of the Máreb as a river,** and applies that name, or, as he writes it, "Maleb," to the desert country just alluded to. But this must have arisen from some misunderstanding; since nothing is more certain than that the Máreb is a river, "large, deep, and smooth," †† which has been crossed by myself in common with all other travellers who have passed (which Dr. Rüppell has not) between A'dowa and Seráwe. ‡‡ That this river becomes nearly stagnant in the dry season is, however, not to be denied; §§ and it may even be that at the height of that season its lower course is altogether dried

* Burckhardt was, however, mistaken in supposing the "Mogren" to be the lower course of the Máreb. See his 'Travels,' p. 264. † Vol. iii. p. 177.

‡ In Ritter's 'Blick in das Nil-Quellland,' p. 43; and 'Monatsberichte' of the Geographical Society of Berlin (1845), vol. ii. p. 16.

§ i. e. the moving sand-hill.—F. S.

|| 'Bulletin de la Société de Géographie de Paris,' 3rd Series, vol. iii. p. 37.

¶ See Lefebvre, in 'Bulletin, &c.,' 2nd Series, vol. xiv. p. 130.

** 'Reise in Abyssinien,' vol. ii. p. 301, *sq.*

†† Bruce, 'Travels to discover the Source of the Nile' (Edit. pr.), vol. iii. p. 116.

‡‡ See 'Journal of R. G. S.,' vol. xiv. p. 64.

§§ Ibid.

up. Still it is most probable that during the rains its waters find their way to the Tákkázie.*

As early as the beginning of the seventeenth century the Portuguese missionaries in Abessinia had laid down the Máreb, in a general way, as rising in the neighbourhood of Dobárwa, in Hámasien, the most north-easterly province of the kingdom of Tigre; and in their maps they plainly showed the remarkable peculiarity which it possesses, in common with many of the rivers of the Abessinian table-land, of returning on itself, so as to perform a sort of spiral course.† In the more recent maps the upper portion of the Máreb has gradually been withdrawn from its true position, till at length even its existence has been disputed. But in the map of MM. Combes and Tamisier ‡ the Máreb, notwithstanding that it is not quite correctly laid down, is restored to its importance as a river, and the general accuracy of the delineation of its upper course by the earlier Portuguese is established.

On its right bank the Máreb is shown in the maps, apparently on the authority of Bruce, as receiving the Lidda, which river has its head in close proximity to that of its recipient, though its course is considerably to the northward of the latter.§ It may be, however, that the Lidda is only the upper course of the Sitit, or Khór el Gash. On its left bank the Máreb is joined by the Angúya, which river has its rise not far from A'degrat, the chief town of Agámie, and is erroneously made by Rüppell to appropriate to itself the honour of being the upper course of the former river.||

As Tigre is that portion of Abessinia which has been the most frequented by Europeans, it would naturally be imagined that its rivers would be well known and their courses accurately ascertained. Yet such is far from being the case. Even the Hássam (not Assa nor Assam), the small stream flowing by A'dowa, a place which has been visited by every traveller in Tigre and where many of them have resided for years, was

* M. d'Abbadie states that the lower portion of the Máreb is called *Gash* (Gach), and that it joins the Atbarah *above Kóz-Radyeb*, but apparently only during the rains. See 'Bulletin,' 2nd Series, vol. xviii. p. 205. But if M. Petit is correct in his information, there must be here some confusion of this river with the Sitit of M. Cailliaud. M. d'Abbadie further describes a *second* river Máreb, also called A'usaba, as rising like the other near Dobárwa, but running northwards, and discharging itself into the Red Sea near Suwákín.

† This led Vossius to place here the peninsula of Meroë. See Delisle, in 'Mémoires de l'Académie Royale des Sciences,' 1708, p. 368.

‡ 'Voyage en Abyssinie,' 8vo., Paris, 1838. Dr. Rüppell says, however ('Reise, &c.,' vol. ii. p. 301), that this is merely copied from Berghaus's Map of the Nile.

§ Much more precise information respecting all these rivers is requisite, before we can determine their courses satisfactorily.

|| 'Reise in Abyssinien,' vol. ii. p. 301.

always regarded as joining the Máreb (it being so laid down in the maps of Bruce, Salt, and others), till Dr. Rüppell first pointed out that in reality it flows south-westward towards the Tákkázie.* But this state of things is on the eve of terminating. The military survey of the whole of the north of Abessinian lately executed by MM. Galinier and Ferret by order of the French Government, and that made by M. Lefebvre and his colleagues under the same auspices, will, when their results are published (which may shortly be expected), clear up all doubts upon this subject, as likewise on many other points connected with the topography of that country.

Leaving the Máreb, we have now to proceed up the right bank of the Tákkázie. This river is joined by several streams, which bear to it the waters of the north-east of Abessinian, among which are especially to be named the Gebáa (the Gibba of Salt), which divides the district of Sahárte from Témbien, and the Arékwa, which joins the Tákkázie between Témbien and Abargáale.

A little to the south of the junction of the Arékwa, the Tákkázie divides into two arms. Of these the eastern one is called the Tselári, while the western one retains the name of the main stream, though in size and in the quantity of water which it carries to the common channel the former river is at least equal to the latter,† and according to Bruce‡ it is the principal branch.

A recent French traveller, M. Even, in his journey through Lásta to Shoa, followed the course of the Tselári from near its junction with the Tákkázie to its source; and in the map of his route recently published§ the name of the latter river is attributed to the former. This I am inclined to regard as an error. As far as my own personal knowledge extends—and I have crossed *both* rivers—the western or left branch is called the Tákkázie, and the right or eastern one the Tselári. Dr. Krapf also mentions having crossed the *Terári* (as the name is frequently pronounced) not far from Lake A'shangí;|| but he makes no allusion whatever to the *Tákkázie* as being in that direction. The Tselári is stated by Bruce¶ to rise in A'ngot, near a spot named Suámi Midre, close to the village Gurri, where it has, he says, three spring-heads or sources like the Abáí. It receives a large proportion of

* 'Reise in Abyssinien,' vol. i. p. xi. sq.; and see 'Journal R. G. S.,' vol. xiv. p. 63. In M. Even's Map of Abyssinia, just published in Paris, the old error is repeated.

† 'Journal R. G. S.,' vol. xiv. p. 59.

‡ 'Travels, &c.,' vol. iii. p. 156.

§ 'Carte générale de l'Abyssinie, &c.,' par P. F. Even; Paris, 1846. This map appears to be a copy, not always accurate, from mine in the fourteenth volume of the Society's 'Journal,' on which the traveller's route has been filled in by no very skilful hand.

|| 'Journals of the Rev. Messrs. Isenberg and Krapf,' p. 463.

¶ 'Travels,' vol. iii. p. 156.

the waters of Wág as far as Wóffa. Its principal tributary on the right bank is the Zámra, which rises in Wódjerat and receives the waters from the southern side of Endérta.* Of this latter river the Tsána crossed by Dr. Krapf † is a tributary. Southward of the Zámra the Tselári is joined by the Sássela, coming from Wóffa.‡ and by the Shémsheho and Gébía, two rivers mentioned by Dr. Krapf as having been crossed by him.§ Of the tributaries of the Tselári on its left bank, I am acquainted only with the Káha, a small stream, which runs to the east of Sókota, the capital of Wág, and is joined by the Chúa coming further from the east; the Shagálu, a "torrent," which falls into the Tselári much further to the north, and down the dry bed of which I journeyed in the month of April, 1843, on my way from Wág to Bóra; and the Mai Lómi, the upper portion of which was visited by me before reaching the Shagálu, and which joins the main stream somewhat lower down towards the north-west.

The high land of Lásta, of which Mount Biála forms the northern extremity, divides the head waters of the Tselári from those of the upper Tákkazie.¶ Ascending the right bank of this latter river above the confluence, we meet with the Télla, A'rri, and Mérrí, all having their rise on the western flank of Mount Biála. The source of the Tákkazie itself is in the kingdom of Lásta, and in the neighbourhood of Lalíbala, one of the most celebrated places in all Abessinía, and remarkable for its churches hewn out of the living rock. Of these churches a minute description, with plans, is given by Father Francis Alvarez, who visited the spot in the year 1520.¶ In Biégamider I heard, that, shortly before I passed through that country, M. Antoine d'Abbadie had visited Lalíbala; but I have not been able, since my return to Europe, to find any record of the fact. Should it be as reported, that traveller will doubtless have it in his power to lay down, with accuracy, the position of the head of the Tákkazie and the direction of its upper course, and thus to clear up the discrepancy between my description of it from information obtained from native sources,** and that given by Mr. Salt †† on the authority of Pearce.

Passing over to the left bank of the Tákkazie and following its course downwards, we shall not pause to consider the various small streams which fall into it from Biégamider and the adjoining districts, but shall proceed at once to the Béllegas, or Shoáda. This river has its rise in the lofty mountains of Sámien,††

* 'Journal R. G. S.,' vol. xiv. p. 59.

† 'Journals,' p. 490.

‡ 'Journal R. G. S.,' vol. xiv. p. 58.

§ 'Journals,' p. 484.

¶ 'Journal R. G. S.,' vol. xiv. p. 58.

¶¶ 'Viaggio nella Ethiopia,' in Ramusio's 'Navigationi e Viaggi' (Venetia, 1563, Edit. 3^a), vol. i. pp. 210, *seqq.*

** 'Journal R. G. S.,' vol. xiv. p. 54.

†† 'Voyage to Abyssinia,' p. 277, *sq.*

†† Rüppell, vol. ii. p. 64, *sq.*

and taking a spiral course to the S. and E.—in a direction contrary to that of most other rivers of Abessinia, which go round to the S. and W.—joins the Tákkazie at some distance to the south of its confluence with the Tselári. Further down are the Angrab and Gwangwe, rivers of some magnitude, having their rise in the province of Démbea, in the vicinity of Lake Tsána. These rivers, the head-streams of which were crossed by Bruce* on his road from Góndar to Sennár, unite with the Tákkazie in the low marshy and woody districts of Waldábba and Walkáit, opposite, as it would seem, to the confluence of the Máreb with the same river.

Below this, we are not acquainted with any tributaries of the Tákkazie or Atbarah on its left bank; and we may therefore take leave of that river, and pursue our original course up the right bank of the Nile.

For upwards of 160 miles from the junction of the Atbarah, the main stream may be ascended without meeting with anything which deserves particular mention, till in lat. $15^{\circ} 37' N.$, at a short distance to the south of the town of Halfáyah, we come to the confluence of the Bahr el Abyad and the Bahr el Azrek—the White and Blue Rivers.

Without pausing here to institute any comparison between these two rivers—a subject which will be more in place in a later portion of this investigation—we shall proceed to ascend the right bank of the Bahr el Azrek. Here we first meet with the Ra'ad (Rahad),† and then the Dender; two rivers having their rise in the high land to the west of the lake of Démbea, and both running from about S.E. to N.W., in courses nearly parallel to the Blue River itself.‡ The source of the Ra'ad is not far from Chélga; and it flows between Kwára and Sennár, forming the boundary between Abessinia and Nubia. In the latter country it is known by the name of Shimfah.§ At its junction with the Bahr el Azrek, the bed of the Ra'ad is from 150 to 200 paces in width, but it is full of water only during the rains: at other times of the year it is in several places almost dry.||

The precise position of the source of the Dender is not known; but this river is said to be of greater length than the Ra'ad.¶ In March, 1841, I crossed the head of a small stream named Gúder, having its rise in Mount Barf, in A'gaumider, in $11^{\circ} 5' N.$ lat. and $36^{\circ} 40' E.$ long., at a short distance westward of the source of the Abáï; and I was informed that this stream (the Gúder) falls into the A'sher, which joins the Bahr el Azrek

* 'Travels,' vol. iv. pp. 314, 321, 324.

† Cailliaud, vol. ii. p. 219.
Cailliaud, vol. ii. p. 220.

‡ Ra'ad, i. e. "Thunder."—F. S.

§ Bruce, vol. iv. p. 416.

¶ Ibid.

far to the north.* I look upon it that the A'sher is the same as the Dender, or, at all events, one of its principal tributaries; so that, from the head of the Gúder to the junction of the Dender with the Baħr el Azreħ, the Dender has a course of at least 250 miles in length. When Bruce crossed this river at the end of April, almost at the close of the dry season, its waters stood in pools; but, from the width of its banks (Cailliaud says about 200 paces), and the great depth of its bed—all of white sand—it would seem that during the rains it contains nearly as much water as the Baħr el Azreħ.† It is important to bear in mind the length and size thus attributed to the Dender, as they will form material features in the consideration which will shortly be given to the subject of Cailliaud's river "Hessén."

Beyond the Dender, and considerably to the south, we come first to the Sodahab, mentioned by Cailliaud‡ as being a day's journey to the north of Famaka, a place on the right bank of the Baħr el Azreħ, opposite to Fázokl; and then to the Gana,§ half-a-day's journey higher up. Both the Sodahab and the Gana are stated to be "torrents," that is to say, streams which cease to run in the dry season. From the position of the Bolássa and Dúrra, two rivers of A'gaumider, which join the Baħr el Azreħ in the country of the Shánkālas, or Negroes, below Chughái,|| it would seem that M. Cailliaud's two "torrents" are the lower courses of those streams,¶ which, having their sources in a country of no great elevation, and being not more than 90 miles in length—for the head streams of the Dender cut them off from coming from further east than about 36° 30' E. long.—have not sufficient water to cause them to flow throughout the whole year.

Above these two torrents, Cailliaud places, from hearsay, a river, named *Hessén*, coming from the S.E., and having its confluence with the Baħr el Azreħ not far from the junction of the Yabús with that river, but on its opposite bank; ** that is to say, in about 10° 40' N. lat., as laid down in that traveller's map. The Hessén is "said to be as large as the Dender."†† Upon this, the question arises where a river of such magnitude can have

* 'Journal R. G. S.,' vol. xiv. p. 10, *sq.*

† Bruce, vol. iv. p. 419. Cailliaud says (vol. ii. p. 220) that the Dender is never absolutely dry at any time of the year.

‡ Vol. iii. p. 62.

§ *Kaís* in Arabic means "Red or black water."—F. S.

|| 'Journal R. G. S.,' vol. xiv. pp. 8, 11.

¶ M. d'Abbadie mentions the Gadjué in Alafa, and the Alatis in Kwára, as coming between the Dender and Bolassa. See 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 111.

** *Yebús* signifies "dry" in Arabic.—F. S.

†† "Une seconde, que l'on dit être aussi considérable que le Dender, et qui se nomme *Hessén*, vient du sud-est, et a son embouchure à peu de distance de l'*Yabonas*."—'Voyage à Méroé, &c.,' vol. iii. p. 61.

its origin and course. If we consider the position of Mount Giesh, in $10^{\circ} 58' N.$ lat. and $36^{\circ} 50' E.$ long.; on the one side of which rises the Abáï having its course northwards, and on the other side the Fátam running to the S.—the sources of some of the head-streams of those two rivers being almost contiguous; * it is impossible that any river coming from the S.E., and joining the Baħr el Azreħ in about the parallel of $11^{\circ} N.$ lat., should have a course of 100 miles in length; much less 250 miles, which is the length of the Dender. And if, further, we consider the position of the Zingini, the head of which river is close to that of the Gúder (that is to say, of the upper course of the Dender), and the entire course of which I am acquainted with from personal observation,† we shall perceive that this length of 100 miles must, in fact, be considerably reduced. Where, then, shall we find a place for the *Hessén* of the French traveller—a river “as large as the Dender”?

To enable us to answer this question, we must first discuss another, viz.: whether the Abáï—the “Nile” of the Portuguese and of Bruce—is, in reality, the upper stream of the Baħr el Azreħ; or whether its sources ought not to be deprived of the honour of being regarded as the fountains of the Blue River, in the same way as they have already lost that of being those of the true Nile.

For the decision of this question, it is necessary to ascertain what is really known to us of the course of the Baħr el Azreħ above $11^{\circ} 14' N.$ lat., where it is joined by the Túmat from the W.;‡ beyond which point, or thereabouts, the personal observation of European travellers ceases. In the first place, M. Cailliaud says,§ that, from repeated inquiries of the natives, he learned that *the Blue River comes from much higher up than Abessinia*, and that it winds for a distance of 30 days' journey round a mountain called Djebel Mehet. He remarks that “it is difficult to draw any reasonable conclusion from information so vague and probably unfounded;”|| and accordingly, in the construction of his map, he would seem to have disregarded it altogether, and to have given the Baħr el Azreħ the course usually attributed to it; though, by his so doing, the *Hessén*—a river “as large as the Dender”—sinks into an insignificant “torrent.”

In the next place, Mr. English, who was in Sennár at the same

* See ‘Journal R. G. S.’ vol. xiv. p. 12. In the Amharic language the word *Fátam* signifies “end” or “termination.” As this river actually shuts in the peninsula of Gódjam, so as to leave a *portage* of barely a couple of miles between its head and that of the Abáï, it may be presumed that the name is significant, and derives its origin from this circumstance.

† See the Map in ‘Journal R. G. S.’ vol. xiv. part i.

‡ Ruesegger, ‘Reise in Europa, Asien, und Afrika,’ vol. ii. part ii. p. 552.

§ Cailliaud, vol. iii. p. 59.

|| Ibid.

time as Cailliaud, was told by the people of the country, as well as by caravan-merchants, that * “the source of the Adit (so the people of Sennaar call the river that runs by their city), is in the Gibel el Gumara † (i. e. that great range of mountains called the Mountains of the Moon), about sixty days’ march of a camel from Sennaar, in a direction nearly south. It receives, at various distances above Sennaar, several smaller rivers which come from Abyssinia and from the mountains south of Sennaar.” On a consideration of the whole subject, Mr. English is “disposed to believe that *the main stream of the Adit, or Nile of Bruce, does not take its rise in Abyssinia*, but rather in the mountains assigned as the place of its origin by the people of Sennaar.” For, he says, “on viewing the mass of water that runs by Sennaar, even now [between the 7th and 14th of Shawál=7th and 14th of July, 1821] when the river has not attained two-thirds of the usual magnitude it acquires during the rainy season, I can by no means believe that the main source of such a river is only about 300 miles distant from Sennaar.” ‡

The evidence of a more recent traveller, M. Russegger, is of even greater weight than that of the two former authorities, inasmuch as he gives us the result of his own personal observations; he having ascended the Baħr el Azrek and its tributary the Túmat much further to the S. than the others, and having likewise gone eastward towards the Yábús, which they did not. The extreme southern limit of M. Russegger’s journey was the camp on the Pulkhidía, between the Túmat and Yábús, in 10° 16’ 17” N. lat. § Before leaving this spot, he went a little way westwards to the summit of Mount Gewésh, to observe the surrounding country. “From hence,” he says, || “we had a splendid prospect. . . . Towards the E. we saw some very lofty mountains in the Galla country, on the Yabús and Baħr el Azrek. Of these, Belfudi, Beshori, and Belamili, three mountains in a south-easterly direction *on the right bank of the Baħr el Azrek*, were most remarkable for their height and immense size. On the horizon, peak was seen to rise above peak, and it appeared that in that direction there must exist a connected chain of mountains of considerable extent and importance.” This information is too

* ‘Narrative, &c.,’ p. 179.

† He means Djebel el Kámar, i. e. “Mountains of the Moon.”—F. S.

‡ P. 182. These arguments of Mr. English, as cited in Dr. Russell’s ‘Nubia and Abyssinia,’ p. 70, *sq.*, were referred to by me in a letter to the Reverend J. M. Trew (now Archdeacon of the Bahamas), written at Yáush, in Gódjam, on the 6th September, 1842, as confirmatory of the conclusion to which I had at that early period arrived, from independent native evidence, of the existence of a great western branch of the Baħr el Azrek. See page 26, *sq.* of the present Essay.

§ ‘Reise, &c.,’ vol. ii. part ii., p. 580.

|| Ibid., p. 590.

precise to admit of misconception; and, accordingly, the right or eastern bank of the Baħr el Azreḵ being shut in by these mountains, the southern course of that river is absolutely determined as far as $9^{\circ} 35'$ N. lat.; as it is laid down, in fact, in M. Russegger's map of East-Sudān accompanying his work.

The course of the Baħr el Azreḵ being traced thus far to the south, we have next to inquire what are its position and direction higher up the stream. On this point M. Russegger expresses the opinion that "the identity of the Abāi of Abessinia with the Baħr el Azreḵ cannot be questioned;"* the course of its upper stream between Gódjam and Shoa having, as he says, "been unquestionably established as far southwards as the ninth parallel of north latitude."† And he goes on to say‡ that Bruce's position of the southern curve of the Abai, in about 10° N. lat., "is decidedly erroneous; this curve lying, according to the reports of the latest travellers in Shoa and his (Russegger's) own observations, much further to the south."

In this remark respecting the position of the southern curve of the Abāi, M. Russegger agrees with Mr. McQueen; who, in his 'Geographical Memoir,' prefixed to the 'Journals of the Rev. Messrs. Isenberg and Krapf,' states§ that "the Nile [Abāi] goes a little farther S., about 20 miles, than it has hitherto been laid down;" in accordance with which opinion he carries the curve of the river as far to the S. as $9^{\circ} 30'$ N. lat.|| No "traveller in Shoa," except myself, has, however, had an opportunity of ascertaining from personal observation the extent southwards of the curve of the Abāi; and as its latitude at several points was determined by me astronomically, I may, without fear of contradiction, assert that the extreme southern limit of that curve, near the ford of Mélka-Kúki, in Líban, in about $37^{\circ} 30'$ E. long., is not more than $9^{\circ} 52'$ N. lat.; while at the ford of Mélka-A'bro, in Shínasha, in about $36^{\circ} 25'$ E. long., the course of the

* 'Reise, &c.,' vol. ii. part ii. p. 73.

† Ibid., p. 73, sq.

‡ Ibid., p. 75.

§ P. [28].

|| See the maps accompanying the work of Messrs. Isenberg and Krapf. The date of these maps is June, 1843. In December following, the map to Major Harris's 'Highlands of Æthiopia,' constructed by Mr. McQueen, brings back the southern curve of the Abāi to its former position. There is also a no less marked variation between the map in Major Harris's work and those in Messrs. Isenberg and Krapf's volume, with respect to the eastern limit of the curve of the same river, which variation is as much as half a degree of longitude.

The delineation of the peninsula of Gódjam in the map in Major Harris's work is strikingly similar to mine in the 14th volume of the 'Journal of the Royal Geographical Society.' This latter was not published till July, 1844; but Mr. McQueen had the use of the original drafts of the eastern portions of it as early as June, 1843 (see 'Friend of the African,' vol. i. p. 27), and doubtless "preserved a copy" of them, in the same way as he says he did of my map of the 6th September, 1842 (see 'Blackwood's Magazine' for June, 1844, vol. lv. p. 739), which reached his hands at the same time.

river advances as far N. as $10^{\circ} 17' N.$ lat. ; its direction, at this latter point, being about west-north-west. Now, it is *physically impossible for a river in this position and with this course, to be the upper portion of the Baħr el Azrek, which was traced by Russegger as far southwards as $9^{\circ} 35' N.$ lat., and there found to come from still further south.** Consequently, that traveller is in error in his identification of the Abáí with the upper course of the Baħr el Azrek, or Blue River, as laid down by him ; and Messrs. Cailliaud and English were correctly informed that the latter river has its rise in the Galla country to the S. of Abessinia.

It will, by and by, be shown that it is the *Dedhësa* which is the direct stream of the Baħr el Azrek ; † but the system of investigation adopted in the present Essay requires that we should, for the present, confine ourselves to the Abáí. From what has been already advanced, we cannot come to any other conclusion than that this river is merely *a tributary* of the Baħr el Azrek ; and thus we can readily understand, that, when M. Cailliaud's native informants in Sennár described to him the Hessénn, a river "as large as the Dender," joining the Baħr el Azrek from the south-east, they meant no other than the Abáí. In further corroboration of this conclusion, we find in M. Russegger's map a dotted line, which is evidently intended to represent the course of a considerable stream, joining the Baħr el Azrek on its right bank, in about $11^{\circ} N.$ lat. ; and if the line of the Abáí, as determined by myself, be continued from my extreme point at Málka-A'bro, in Shínasha, in the direction of about W.N.W., it will be found to meet the Baħr el Azrek just at the place so marked in Russegger's map as the point of junction with a tributary.

Regarding it, then, as an established fact, that the Abáí is not the direct upper course of the Baħr el Azrek, but a tributary of that river and identical with the Hessénn of Cailliaud, our next task is to proceed upwards along its right bank. The spiral course of the Abáí round the peninsula of Gódjam is too well known to require more than an allusion to it. All round this curve the river is joined by numerous streams, having their sources in the mountain-chain which forms the core of the peninsula, and to which, in the absence of any generic native name, may be attributed the appellation of Tálba-Wáha, ‡ such being the designation of the most elevated and best known portion of the entire range. § It is not necessary here to particularize these tributary streams, all

* On the 18th December, 1843, I placed in the hands of Col. Jackson, the Secretary of the Royal Geographical Society, a sketch showing the non-identity of the Abáí with the Baħr el Azrek of M. Russegger's map.

† See page 26, *sqq.*

‡ In Amharic means "flax river"—also "linseed-tea!"

§ 'Journal R. G. S.' vol. xiv. pp. 1, 29, 30, 43.

of which are shown in the map contained in Vol. XIV. of the Society's 'Journal.'*

Neither is it within the scope of the present Essay to give any description of the source of the Abáí, a spot which Bruce has rendered so famous. But, while alluding to the subject, it would ill become me to pass it over without bearing testimony to the minutely accurate description of this spot first given by Father Peter Paez, who visited it in the beginning of the seventeenth century.† The attempt made by our countryman‡ to deprive Paez of the merit of having anticipated him in the discovery and description of the source of the Abáí, or supposed Nile, must ever

* Bruce (vol. iii. p. 257) thus defines the position of the province of Damot:—"On the south-east of the kingdom of Gojam is Damot. It is bounded by the Temci on the east, by the Gull on the west, by the Nile [Abáí] on the south, and by the high mountains of Amid Amid on the north. It is about 40 miles in length from north to south, and something more than 20 in breadth from east to west." And accordingly that province is laid down in his map as being situate in the south-eastern corner of the peninsula of Gódjam. On my own entrance, however, into the peninsula from the east, towards the end of the year 1841, I found the province of Gódjam Proper to occupy the precise situation attributed by Bruce to Dámot; and on my further journey into Dámot and A'gaumider in the beginning of 1842, I found the true position of Dámot to be altogether to the west of Gódjam Proper, extending at least 60 or 80 miles from east to west, and lying to the south and south-west of the source of the Abáí, i. e. beyond it.

With regard to the rivers "Temci" and "Gult," mentioned by Bruce as being the boundaries of Dámot on the east and west, I must remark that during a residence of fifteen months in the peninsula of Gódjam, and repeated journeys through it in various directions, I could neither find nor hear of any rivers of those names either in or adjoining to Dámot or Gódjam Proper, though I frequently inquired after them, they being laid down, from Bruce, in Arrowsmith's map, which I had with me. But in the north-east of the peninsula—Dámot being in the south-west—between the districts of Enfásie and Móta, I met with the Támmie ('Journal R. G. S.,' vol. xiv. p. 28),—evidently the Temee of the Portuguese Jesuits, for which I imagine Bruce's Temci is intended; and close to it I also found the Gult, which is the upper course of the Tádjatiel, a tributary of the Támmie (Ibid., p. 44).

As Dámot is situate altogether to the south and south-west of the source of the Abáí, that is to say, beyond it, it is manifest that Lobo, in proceeding to Lidja-Negús (Liginous = Lidja-Nekús) in Dámot, whither he was sent to establish one of the religious houses of his Order, must have passed by, or very near to, the source. Another of the residencies of the Jesuits was at Temhuá (Tummahá) in A'gaumider, at a distance of less than thirty miles beyond the source of the Abáí (see 'Journal R. G. S.,' vol. xiv. p. 7); and one was also at Nefasá, only a league and half to the west of the upper course of that river, between its head and Lake Tsáua. (See 'Archæologia,' vol. xxxii. p. 42, sqq.) It is therefore quite a fallacy to suppose that the Jesuits in Abessinia had any difficulty in visiting the source whenever they may have thought proper to do so.

Such being the case, and the positions of Temhuá and Nefasá being laid down in Telles's map with tolerable accuracy, Bruce cannot well be freed from the suspicion of having intentionally misplaced Dámot.

Other residencies of the Jesuits within the peninsula of Gódjam were at Kóllella, Hádasha, Sérka, and Mártula Máriam. At this latter place a splendid church was begun to be erected by Father Bruno Bruni in 1627, but was left unfinished in 1633, when he and the other members of his Order were compelled to quit Gódjam. A brief account of the ruins of this church is given in 'Journal R. G. S.,' vol. xiv. p. 26, sq., and a detailed description, with plates, will be found in 'Archæologia,' vol. xxxii. p. 38, sqq.

† See Kircher's 'Œdipus Ægyptiacus,' Syntagma I., cap. vii. p. 57, sqq.

‡ 'Travels,' vol. iii. p. 615, sqq.

remain a sad blot on the fame to which he had sufficient legitimate claims, without seeking to appropriate to himself what justly belonged to others.* It is not my intention here to enter into any details on this unpleasant subject, especially as I have felt it my duty, as the first traveller possessing from personal observation the means of fully estimating the relative value of Bruce's statements and those of Paéz, to record the result of my investigations in a communication which I am about to make to the Geographical Society of Paris.†

Leaving the source of the Abáï and proceeding down its left bank, we come to Lake Tsána, also called the Lake of Démbea, through the southern extremity of which the river passes, its current being distinctly visible across the waters of the lake. About fifteen miles lower down we reach the A'lata, a small stream inconsiderable in itself, but entitled to particular mention on account of its proximity to the cataract of T's Esát, or "The Smoke of Fire,"‡ which Europeans, from Father Jerome Lobo§ downwards, have called the "Cataract of A'lata," after its name.

The first river of magnitude falling into the Abáï on its left bank is the Báshilo, the recipient of the waters of the province of Amhára, and as such well known to us from the writings and maps of the Portuguese. Its source is at the northern foot of Mount Sagarat,|| at the extreme eastern edge of the table-land, and not far from the sources of the Bérkona and Mílli, two tributaries of the Hawásh.¶ Next in order is the Wálaka (or Shónkora ?) of smaller size, which has its course through the district of that name, now inhabited by sub-tribes of the Túloma Gallas; and further to the south is the Djámma, one of the largest tributaries of the Abáï, which receives through it the waters of the whole of Shoa, Márrabiete, Mans, and Tégulet, as far as the western flank

* Bruce's dishonesty, which a reference to Kircher's 'Œdipus,' a book which he probably never saw, could not but immediately detect, was completely exposed as early as 1796 by Professor Hartmann, in his 'Edrisii Africa,' p. 13, *sqq.*—F. S.

† My two visits to the source of the Abáï are described in 'Journal R. G. S.,' vol. xiv. pp. 12 and 34. M. Arnauld d'Abbadie and Mr. Bell had both been there before me; and the latter has given a short account of his visit in 'Miscellanea Egyptiaca' (4to. Alexandria, 1842), vol. i. part i. p. 22. M. Antoine d'Abbadie has since been there, and his visit is recorded in the 'Bulletin' of the Geographical Society of Paris, 3rd Series, vol. iii. p. 346, *sqq.*; and 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 221, *sqq.* His remarks on my description of the source are commented on by me in the latter work, 1846, vol. iii. p. 223, *sqq.*

‡ A description of this cataract and of the bridge near it, is given in 'Journal R. G. S.,' vol. xiv. p. 48, *sq.*

§ Bruce (vol. iii. p. 425, *sqq.*) is not less unjust to Lobo with reference to this cataract, than he is to Paéz in respect of the source of the Abáï; as will be shown in my communication to the Geographical Society of Paris, above alluded to.

|| 'Journals of Messrs. Isenberg and Krapf,' p. 419, *sq.*

¶ For proofs that the Mílli (the Melee of the Maps) is a tributary of the Hawásh, see 'Journal R. G. S.,' vol. xiv. p. 72; and Johnston's 'Travels in Southern Abyssinia,' vol. i. p. 197.

of the mountains of I'fat (or E'fat). This river, like the Bāshilo, was first made known to us by the Portuguese. From the Itinerary of MM. Combes and Tamisier,* which is very incorrectly represented in the map accompanying their 'Travels,' and from that of Dr. Krapf,† which is scarcely less accurately laid down in the map illustrating his 'Journals,' we are made acquainted with the numerous tributaries which unite to form this river, the main stream of which has been traced by myself throughout the greater portion of its course.‡ Of these tributaries the principal one is the Wānchit—the Anacheta of the Portuguese—which, like the Djāmna itself, was crossed by Alvarez in 1520 on his way to Shoa.§

To the south again of the Djāmna is the Múger, or Mógur, which river rises in the lofty mountains of Salála, on the opposite flank of which are some of the sources of the Hawásh. In the lower part of its course the Múger forms the boundary between the Túloma and the Kúttai Gallas.¶ Where it joins the Abái, the latter river has already quitted its southward course, and has taken a direction westwards along the south of the peninsula of Gódjam, separating it from the table-land now inhabited by Galla tribes, but which, as is shown in the maps of the Portuguese, was formerly the country of the Gáfats, of Dámot, and of Bizámo. In consequence, however, of the irruption of the Gallas and their occupation of the districts to the south of the Abái, the inhabitants of Gáfat and of Dámot were driven across that river into Gódjam, where they have perpetuated their names and languages.¶

Of the various streams which flow into the Abái along the southern part of its course to the south of Gódjam, it may be sufficient to mention the Gúder, which forms the boundary between the Gallas of Kúttai and Líban to the E. and those of Gúderu to the W.; the Fincháwa, or Agúl, between Gúderu and Hóro; and the Dibúk and Aléltu in the country of A'muru.**

M. d'Abbadie further names the "*Wālmál* (Ouelmál) of Limmu," as a tributary of the Abái††; the mention of which stream calls for some special observations with respect to a certain river

* 'Voyage en Abyssinie,' vol. i. pp. 167—346, *passim*.

† 'Journals of Rev. Messrs. Isenberg and Krapf,' pp. 277—315, *passim*.

‡ 'Journal R. G. S.,' vol. xii. p. 247, *sqq.*

§ In M. Even's Map the Wānchit is altogether omitted.

¶ 'Journal R. G. S.,' vol. xiv. p. 23. M. d'Abbadie says, in a letter from Gódjam, dated April, 1844 ('Nouvelles Annales des Voyages,' 1845, vol. ii. p. 112), that "the Mogar has its source in Limmu, and separates Chélea from Hébantu;" but this is a mistake, unless he speaks of some other river of the same name with which I am unacquainted.

¶¶ See 'Proceedings of the Philological Society,' vol. ii. p. 93.

** These rivers are all laid down in the map in the 14th volume of the Society's 'Journal.'

†† 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 112.

“Habáhia,” which has of late years found a place in our maps. The first mention of the Habáhia was made by M. Jomard in his very interesting ‘Notice sur les Gallas de Limmou,’ contained in the ‘Bulletin de la Société de Géographie de Paris,’* which Memoir was drawn up from information obtained from a young Galla lad named Wáre (Ouarè), a native of Sóbiche in Limmu. Wáre expressly stated that his country, Limmu, was situate on the banks of a large river named Habáhia, having among its tributaries the *Wálmá* (“Wouelma”), or, as it is written in the map accompanying the memoir, “Ouelmâl,” i. e. *Wálmál*. From the great distance said to have been travelled by the young Galla from Sóbiche to the ford of the Abáí (Mélka-Fúri) between Gúderu and Básó; from the enumeration of the various districts lying along and on each side of his route; from his express statement that *the Habáhia runs from N. to S.*; and from the various other particulars furnished by him to M. Jomard, the latter was no doubt justified in regarding the “Habáhia” not merely as differing from the Abáí of Abessinia, but as belonging to a distinct hydrographical basin; as being, in fact, the head of one of the streams flowing into the Indian Ocean.

It was not long before this hypothesis was adopted by other writers on geography. The first of these was Mr. McQueen, who, in his ‘Geographical Survey of Africa,’† enters into a detail of arguments intended to prove that the Limmu of Wáre should be placed upwards of a degree to the S. of the position attributed to it by M. Jomard, and nearly 2 degrees further to the W. Of course, the position of the “Habáhia” would have to follow that of Limmu; and, accordingly, that river is laid down in the map accompanying Mr. McQueen’s work, as rising in about 7° 10’ N. lat. and 32° 30’ E. long., and as being the upper course of the “Kilimaney,”‡ which river is shown in the same map as discharging itself into the Indian Ocean in about lat. 3° S.§

* 2nd Series, vol. xii. p. 5, *sqq.*

† P. 231, *sqq.*

‡ So the name is written in the map; but in the body of the work it is “Quilimancy.” The author says, “Proceeding southward from Jubah, we find, betwixt the parallels of 2° to 3½° S., that is, between Malemba [Melindah] and Patta, a large delta thickly intersected by streams, the estuaries of a large river, which, according to the authority of the Portuguese, as searched out by that excellent geographer D’Anville, are the mouths of the great river Quilimancy.”—‘Geogr. Surv. of Africa,’ p. 250.

It may be proper to observe, that in d’Anville’s Map of Africa, published in 1749, it is stated respecting the Zebee, that “the course of this river is *unknown*, and it cannot be determined whether it is the Quilimanci or the river of Paté.”

§ Mr. Arc Angelo, who in February 1844 ascended the Jubb or Gowin (the pseudo-Gódjeb or “Gochob,” see p. 45, *sq.*), says:—“The island of Patte is in about 1° 50’ S.; Melinda is in about 3° S. Between these latitudes, that is, in about lat. 2° 44’ S., is the river Ozy or Ouzay, navigated by small craft chiefly. . . . The river Ozy is of great extent, but has very little water at the entrance. . . . This river is not known to the natives or people on the coast as the ‘Quilmaney.’ . . . The correct latitude of the river Ozy will be found in Capt. Owen’s charts.”—‘United Service Journal,’ 1845, part i. p. 127, *sq.*

Mr. Arc Angelo further remarks: “The only river of Eastern Africa up which the

This view of the course of the "Habáhia" has been likewise adopted, with some slight modifications, by Lieut. Zimmermann and Professor Ritter; the former of whom, in his map annexed to the latter's 'Blick in das Nil-Quellland,' makes that river to be one of the head-streams of the "Goschop," that is to say, the *Gódjeb*, which river, under the name of a "Gochob," and as the supposed upper course of the Jubb or Gowín [*i. e.* the Wábbi-Giwéyna], has of late attracted so much notice.*

The "Habáhia" has, however, since assumed another position. According to M. Russegger,† this river is made by Professor Berghaus, in his 'Grundrisse der Geographie,'‡ to be the upper

Portuguese have penetrated, is the Quilmaney, a branch of the Zambéze, situated in lat. 18° S.—18° of latitude only—from the Juba or 'Gochob,' *besides longitude*.—*Ibid.*, p. 127. In Mr. Cooley's map in vol. xv. of 'Journal R. G. S.,' the river is called the Cuama, and Quilimane is a town at its mouth, in about the latitude stated by Mr. Arc Angelo. Mr. Salt, in the map at p. 12 of his 'Voyage to Abyssinia,' lays down the town of Quilimane on the Zambéze in the same position; but in p. 66, he speaks of "the port of Quilmaney, at the mouth of the river Zambezi."

[When this Paper was read before the Society, on the 28th December, 1846, Mr. McQueen stated that, in his opinion, the Kilimancy and the Kilimane are two distinct rivers. This notion is to be thus accounted for. When lake Tsána was carried away to the south by the early geographers, and was made to take the place of lake Zambéze (as will be shown in page 73), it was quite natural that the Wábbi, a river running at no great distance to the south of the former lake, should have been conjectured to be the head of the Kilimáne, which was well known to enter the Indian Ocean in a parallel of latitude not far south of the latter lake. But the connexion between the two rivers being purely imaginary, it ought of course to have been severed as soon as lake Tsána was restored to its place, and the true position of the Wábbi was found to be to the north of the Equator. *Instead of which, the Kilimáne, under the name of Quilmaney, was made to accompany the Wábbi northwards, and to enter the ocean near Melindah, in about 3° S. lat.; the Zebéé being made by Delisle to supersede the Wábbi as the upper course of that river. The true position of the river Kilimáne (Quilimane), Zambéze, or Cuama, having since been positively determined to be in 18° S. lat., the hypothetical "Quilmaney" in 3° S. lat., would unquestionably have been abandoned long ago, were it not for Bruce's statement (vol. ii. p. 318) that "the Zebée is universally allowed by the merchants of this country [Abyssinia] to be the head of the Quilimancy, which passing through such a tract of land from Narea [Enarea] to near Melinda, must have opened a very considerable communication with the inland country."* As, however, the connexion between the Zebéé and the Kilimáne is one *not of fact, but of hypothesis on the part of the geographers of Europe*, it is manifest that the idea of such a connexion would never have been entertained by the merchants of Abyssinia, who could not well possess any knowledge of a river which runs at a distance of 30 degrees of latitude (1800 miles) away from their country. And the truth is, that when Bruce was in Abyssinia, his own opinion, derived no doubt from native sources, was, as the fact really is, that *the Zebéé joins the Nile* (See page 60, *sq.* of this Essay); and it was only after his return home that he adopted the error of the early Portuguese, as modified by Delisle.]

With reference to the spelling "Quilmaney" for "Quilimane," I cannot do better than cite the following remarks of Mr. Cooley:—"The disfigurement of proper names in the Decades of de Barros and his continuators is so frequent and manifest, that no critical student can allow their text to be conclusive authority with respect to names. We find in their pages 'Aghirimba' for 'Agizimba'; 'Zuama' for 'Cuama'; 'Suabo' for 'Cuavo.' These errors, with hundreds more, have been copied with thoughtless servility."—'Journal R. G. S.,' vol. xv. p. 186. The only mis-spelled names which have to be noticed by me are 'Quilmaney' for 'Quilimane' (Kilimáne), 'Toavy' for 'Tacy' (Takui), 'Zembere' for 'Zambéze,' and 'Abanhi' for 'Abahui' or 'Abáí.'

* See page 43, *sqq.*

† Reise, &c., vol. ii. part ii. p. 98.

‡ Breslau, 1841, p. 286.

course of the Bahr el Abyad, or true Nile; which opinion has been adopted by M. Russegger himself, and likewise by Mr. McQueen in his more recent maps in Major Harris's 'Highlands of Æthiopia' and 'Blackwood's Magazine' for June, 1844.

In the first of these maps Limmu and Sóbiche were made to retain their relative positions with regard to the "Habáhia;" which, seeing that it was from a native of Limmu alone that we derived what knowledge we were supposed to possess of that river and the neighbouring countries, was only consistent and reasonable. But in the latest of them Sóbiche is removed altogether away from the "Habáhia," and is placed to the N. of the "Gochob," while Wáre's country, Limmu, is made to extend as far northwards as Enárea; and in the remarks which accompany this latest map it is stated,* that "Enárea and Limmu are the same." It is added, "There is another Limmu . . . near or the same as Sibou, which, according to Bruce, is ten days' journey from the capital of Enarea, and, according to the French Geographical Bulletin (No. 114), not far from Horro and Fazoglo. *But the first Limmu is the Limmu of Jomard's Galla Oware*, because he states distinctly that Sobitche was its capital; that, in marching northwards from it, he crossed the Wouelmae river; and that Gingiro, *to which he had been*, lay to the right, or east, of his early route; and further that the river which passed near Sobitche ran to the south."†

To these assertions and arguments, however positively advanced, I reply that nothing is more certain than that Wáre's country is not "the first Limmu," namely, "the same as Enárea," but is the "Limmu near Sibou," and "not far from Horro and Fazoglo" (Fazókl). For the young Limmu Galla, Amóchi, whom M. d'Abbadie brought to Europe, was indisputably a native of *Enárea*, and his country was *not* the Limmu of Wáre.‡

Secondly, as regards Wáre's alleged personal knowledge of "Gingiro" *from having been there*, all that M. Jomard says is, that "*Ouaré a aussi connaissance du Djendjiro qu'on suppose sous le 7^e parallèle et sous le 34^e méridien, peut-être trop à l'O. Djendjiro restait à sa droite. Il est regrettable que Ouaré n'ait pas de plus amples notions de ce pays intéressant, appelé tantôt Djendjiro (ou Gengiro) et tantôt Zendero.*"§ *Il passe pour renfermer des*

* 'Blackwood's Magazine,' vol. lv. p. 733.

† Ibid.

‡ See 'Bulletin,' 2nd Series, vol. xii. p. 188. M. d'Abbadie at first doubted the existence of *two* Limmus (ibid., vol. xiv. p. 240), as originally maintained by M. Jomard (ibid., vol. xii. p. 17); but he subsequently admitted the correctness of the opinion of his learned countryman (ibid., vol. xix. p. 438).

§ The native name is Yágar, or Yángaro. By the Gallas it is called Djándjaro, the Gingiro of the Portuguese. This name the Abyssinians change, by way of ridicule, into Zindjéro, which word means "monkey" in Amharic. The people of Tigre, who have a difficulty in pronouncing the *dj*, which sound does not exist in their language, change the Galla name into Zendero.

mines."* This last is manifestly an observation, not of Wáre, but of M. Jomard, with reference to the "mines d'or de Bosham dans le Djendjiro," which are more particularly noticed in the next page of the Memoir. Mr. McQueen appears, however, to understand this observation as coming from Wáre himself, and the words "il passe pour renfermer des mines," as meaning "he had been sent there to stop some mines;"† and understanding it so, it is not altogether unintelligible that he should entertain the opinion that Wáre had been to a country of which, according to M. Jomard's explicit statement, he knew nothing except its name, and that it lay to the right of his route—particulars which Wáre might easily have picked up, and, no doubt, did pick up, from some companion in captivity from Djándjaro, that country being one of those whence Abyssinian slave-dealers obtain their supplies.

And, not to allow any point to remain unnoticed, I must add that to draw a conclusion from the positions of Sóbiche and the river Wálmá, or Walmál, when these positions depend upon those of Límму and the "Habáhia," is merely arguing in a circle; and scarcely even that, since, in his last map, Mr. McQueen has severed the connexion between Límму and the "Habáhia," which connexion was the very foundation of his whole argument. As, however, M. d'Abbadie states the "Ouelmál of Límму" to be a tributary of the *Abát*, even this argument tells against, instead of for, the position which it was intended to prove.

The fact really is, that the idea of the separate existence of the "Habáhia" has arisen altogether from a misconception, as can be demonstrated with ease. Wáre states his native country, Límму, to be on the banks of the Habáhia, in the vicinity of the districts of Wámber, *Síbu*, and *Léka*, and near to the desert country of A'ndak.‡ Further, from the circumstance that in one of his war-songs Límму is coupled with Hébantu (Ebantou),§ it is evident that those two districts are inhabited by neighbouring tribes. Now, in the memoir 'On the Countries south of Abyssinia,' contained in vol. XIII. of the 'Journal of the Royal Geographical Society,'|| and the accompanying map, the situations of Wámbera, Síbu, Léka, Hándak, and Hébantu are all correctly determined and laid down by me—the last district, indeed, from ocular observation.¶ Consequently, the position of Wáre's country,

* 'Bulletin,' p. 10.

† "Gingiro he knew, as he had been sent there to stop some mines. It lay to the right of his early route, that is, to the east of Limmou."—'Geographical Survey of Africa,' p. 252.

‡ 'Bulletin,' p. 8, sq.

§ Ibid. p. 25. "Hebo, hebo, lola!
Hébantu-no lola,
Límму mal'éga!"

"My lance, my lance! to battle, ho!
Hébantu has met the foe.
Why does Límму tarry so?"

|| P. 256. See also the 'Friend of the African,' vol. i. p. 119.

¶ If further identification were necessary, we might adduce Wáre's "Dinigas" (p. 8),

Límmu, called Límmu-Sóbo* to distinguish it from the Límmu of Enárea, cannot possibly be doubtful. It is true that in that memoir the *Habáhia* of Wáre is considered to be the Dedhéa, and not the *Abáí*;† and I should still be inclined to maintain this opinion,‡ were it not that M. d'Abbadie expressly asserts that the "*Ouelmál* of Límmu" is a tributary of the *Abáí*, adding that that river is called Abbaya (*Habáhia*) by the Góngas§ — the very people whose former country is now occupied by the Galla tribes of A'muru, Hébantu, Límmu, &c., to which Wáre belonged. The only conclusion to be formed from the foregoing evidence, therefore, is that the "*Habáhia*" is the *Abáí* of *Abessinia*, Wáre being in error as to the direction of its course, than which nothing is more natural for a person of his limited means of information.

I may almost seem to have entered more into detail than was necessary on the subject of the "*Habáhia*;" but since this imaginary river has been adopted by so many writers of authority as the head either of the "Goschop" or of the Bañr el Abyaḍ, I am satisfied that good service will have been done to geography, by the pains thus taken to expunge from our maps all traces of a river, which has in truth no real existence.‖

Before terminating our investigation of the tributaries of the *Abáí* on its left bank, we have yet to notice a river which holds a

as being the Dínkas, or Doukas (Dongas) inhabiting the country between the White and Blue Rivers.

* Have the names Sobó and Sobiche any connexion?

† P. 256.

‡ In Shínasha I was told that the Dedhéa also bears the name of *Abáí*; and I find among my MS. notes a memorandum of a river *Walmdí*, said to run far to the west beyond Límmu; which would make it to be a tributary of the former river, and not of the latter. But the question is not very material, as in either case the position of Límmu, in the fork between the Dedhéa and *Abáí*, remains the same. From the camp at Mábil, in Shínasha, I saw, just on the horizon, the peak of a high mountain in Hébantu, bearing S. 35° W. This, from its position, would seem to be, if not one of the peaks seen by M. Russegger from Mount Gewésh, at least a portion of the same lofty mountains observed by that traveller on the right bank of the Bañr el Azrek, or Dedhéa. From the same spot Límmu-Sobó was said to bear S. 55° W., beyond but adjoining to Hébantu, and consequently more towards the valley of the river.

§ "Le Abbay, dit fleuve Bleu en aval de sa jonction avec le Didesa, est appelé Abbaya par les Galla et Gongá, Abbawi par les Agaw."—*Nouvelles Annales des Voyages*, 1845, vol. ii. p. 111. "Abbay est une abréviation du Abbaya de la langue Gongá."—*Bulletin*, 3rd Series, vol. iii. p. 346.

‖ Mr. Johnston, in his '*Travels in Southern Abyssinia*,' vol. ii. p. 124, states that "there is a large river, of which every Galla speaks who comes from Limmo, Jimma, and other districts in that [Y] neighbourhood; and which flows south, say Mr. McQueen and Major Harris, whilst Dr. Beke denied its existence altogether, until his (Mr. J.'s) view were laid before the Geographical Society." If, by this "large river," Mr. Johnston alludes to the "*Habáhia*," I of course continue to deny its existence, for the reasons above stated. Or if by it that gentleman means an hypothetical river, having the Gíbe and Gódjeb for its head and the Dedhéa for its tail, as is shown in the Map accompanying his work, this is simply a reproduction of one of the main features of my Map of the 8th September, 1842, which further research has shown me reason to abandon. See, on the subject of this map, page 27, sq. of the present Essay.

The large river beyond Límmu (Enárea) and Djimma-Káka is the Gódjeb, which has no connexion whatever with the river beyond Límmu-Sóbo, namely, the Dedhéa.

prominent place in the maps of the Portuguese. I allude to the Malég, which is stated by Tellez* to have been crossed by Father Antony Fernandes on his journey to Enárea in 1613. To this brief notice of it our knowledge of the Malég is limited, except that in the maps of the Jesuits it is shown to be joined on its right bank by a river, apparently of some size, named the Anquer, i. e. A'nker.† It is important that we should endeavour to ascertain what this river Malég really is, and how far we are warranted in retaining it in its present position in our maps; and for this purpose it is necessary to consider the original description given by Tellez of Fernandes's journey, which appears to have been hitherto strangely misunderstood.

We are told‡ that, departing on the 15th of April, 1613, from Wambárrema (Ombrama), where the viceroy, Ras Sela Kristos, was encamped, Fernandes and his party travelled westwards for 2 or 3 days, through the country of the Gongas, to Shínasha (Sinassé), the principal place of that people.§ Here they had some difficulty in procuring an escort; and when at length they did obtain one, instead of being conducted southwards so as directly to reach the Abáí, they were taken 3 days' journey further west to a place called Minà, at the turn which that river makes northward towards Egypt, and in a line almost due W. from its source.|| The Abáí, which was here large and difficult to pass, was crossed with the help of rafts and men supported by gourds swimming before and behind. *On the following day* they entered the country of the "Casres" subject to the Emperor of Abessinia. By these are evidently meant the negroes, or Shánkãlas, inhabiting the valley of the Abáí below A'gaumider,¶ whom Ras Sela Kristos had only that year rendered tributary.** *On the same day* the guide whom they had procured from Enárea to take them by a circuitous route ("per caminhos desviados"), in order that they might not fall into the hands of the marauding Shánkãlas, led them through the midst of a thick wood, very difficult to pass; whence, by a steep descent, they came to the Malég, a large river, *which they reached at night-fall. The next morning* they crossed the Malég at a ford; and when they had reached the opposite side, being no longer in danger from the Shánkãlas, they went on more tranquilly, and soon ("logo," which

* 'Historia de Ethiopia a Alta,' p. 314.

† In the more modern maps the name is erroneously written Anquer.

‡ Tellez, p. 313, sq.

§ Thus far westwards the road appears to be much the same as that taken by myself in 1842. See 'Journal R. G. S.,' vol. xiv. p. 37, sq.

|| "Em tres dias chegaram a o lugar, aonde haviam de passar o Nilo, o qual se chama Minà, e he ja na volta que elle faz pera o Norte, e pera o Egypto, quasi na frente de Leste a Oeste de sua fonte."—Tellez, p. 314.

¶ 'Journal R. G. S.,' vol. xiv. p. 9.

** See Paetz, in Kircher's 'Œdipus Ægyptiacus,' Syntagma I., cap. vii. p. 59.

may indeed mean "*immediately*") entered Enárea and began ascending a steep mountain to Gónea. Here they were received by the principal chief of that kingdom, and from hence, in 6 days, going always to the S., they reached the court of the king of Enárea, tributary to the Emperor of Abessinia.

Bruce gives* an abstract of Tellez's text as regards Fernandes's route, adding, "The road and the places through which you pass are very distinctly set down in my map, and, I believe, without material error; it is the only place where the reader will find this route, which, till now, has never been published." Nevertheless, that traveller appears to have much misunderstood the subject; for he says that Minà is the "*ordinary passage* into Bizámo on the way to Enárea;"† whereas Fernandes states that he did not go by the ordinary way, but was taken three days' journey further west into the country of the Shánkãlas, and that then he had to go "*per caminhos desviados*." Further, in his map Bruce places Gónea nearly 150 miles to the S. of Minà, and, consequently, almost at the end of the journey to Enárea. Fernandes's account shows, on the contrary, that it was just at the beginning, and that from thence he travelled southwards for six days before reaching the court.‡ The Malég itself, which by Bruce is made to take the place of the A'uker (Anquer) of the Jesuits' map, is placed by him at a distance of 50 miles from Minà; while their Malég becomes his Bahr el Abyad, and Shínasha (Sinassé) is shown by him as being as much as 60 miles from Minà, and only 20 from Wambárrema (Ombrama).

The view which I take of the subject is altogether different. Fernandes, when he arrived at Shínasha, in the valley of the Abáï and close to the river, intended to cross there, that being the direct road to Enárea.§ But the Góngas would not, or perhaps could not, let him pass in that direction, so that he had to proceed much further—"three days' journey"—westwards to the country of the Shánkãlas. Here he crossed the Abáï, just above the point where it is joined, on the opposite bank, by the Malég; and when on that opposite bank, being still within the deep valley of the Abáï, he had next to cross the neck of high land running out between the two rivers. This was done by ascending through the forest which lines the bank of the Abáï, and

* 'Travels,' vol. ii. p. 310, *seq.*

† In my Itinerary in 'Journal R. G. S.,' vol. xiv. p. 39, I have erred in stating that the road by which I descended to the Abáï in Shínasha was the one taken by Fernandes: I had not then seen the original work of Tellez.

‡ "*De Gonaé foram o Embayrador, e o Padre d corte do Beneré, que assim se chamava o Xumo, ou Governador de Nareá, e chegaram lá em seys dias, hindo os primeyros por terras quassi despovoadas por terem dado nellas os Gallas poucos dias d'antes, os mayns dias por terras boas, bem cultivadas, e de muyta gente.*"—p. 315.

§ 'Journal R. G. S.,' vol. xiv. p. 38, *sq.*

then again descending to the Malég. After crossing this latter river, a similar ascent had to be made up its opposite bank, *at the summit of which Fernandes reached Gónea*, situate, as I conceive, on the edge of the table-land, and being an *ám̃ba*, or hill-fort, commanding the W. bank of the Malég, and in like manner overlooking the valley of the Abáí.* Thus far the nominal authority of the king of Enárea, though already broken by the irruptions of the Gallas, appears to have extended; and from hence a six days' journey, *always south*, brought the missionary and his party to the capital.†

It is unnecessary to pursue Fernandes's route further for the present. What has been introduced here is for the purpose of helping us in the identification of the Malég. The Father says, that Minà, at which place he crossed the Abáí, lay *almost due W.* from the source of that river, which would place that spot in near 11° N. lat.; and as the confluence of the Abáí with the Dedhésa lies in about that parallel, it might at first sight appear that the Malég is no other than the Dedhésa, or the direct stream of the Baħr el Azrek, under a different name. But, on the other hand, Fernandes, when in Shínasha, was already to the S. of 10° 30' N.; and as the direction of the Abáí there is *west-north-west*, it is hardly likely, even with his "3 days' journey further west" and his "*caminhos desviados*," that he should have gone back so far to the *north* as to strike the river in the eleventh parallel. It is, therefore, only reasonable to entertain the opinion, that the Malég is some *smaller* stream falling into the Abáí at some distance above, or south-eastward of that river's junction with the Dedhésa. It is true that Fernandes calls the Malég a "large" river, but this indefinite expression proves nothing as to

* My Itinerary affords several instances of *Ambas* similarly placed, such as Dēí, in the fork of the A'dabai and Bérseña; Selalkúlla, between the Abáí and Djám̃ma, &c.

† My own passage of the Abáí, on the way from Shóá to Gódjam (see 'Journal R. G. S.', vol. xii. p. 250, *sqq.*), is in several particulars so strikingly illustrative of that of Fernandes from Gódjam to Enárea, that it is advisable to give a brief summary of it here. From Shóá I was sent by the king to Abba Mólle, the chief of the Múger Gallas, to be conducted across the Abáí. By that chief I was detained several days; and then, instead of my escort's taking me by the direct road westwards, which would have been through the country of the Djársó Gallas, and so across the Abáí *below* the junction of the river Djám̃ma, I was made to turn to the north, and to cross first the Djám̃ma and then the Abáí, *above the fork*. On this "circuitous route" I had first to descend to the Djám̃ma through a thick wood, next to ascend to Selalkúlla, situate in the fork between the two rivers, and then to descend again to the Abáí, which river was passed with the aid of swimmers with gourds lashed to the small of the back, my luggage being carried over on a sort of small raft. In all these particulars the narratives of Fernandes and myself are identical, subject to the mere alteration of the names of the rivers and places. After crossing the second river, I had to reach the high table-land of Gódjam by an ascent, not so steep as that by which the missionary reached Gónea, and consequently so much the longer; after which my route lay for a continuance over the table-land of Gódjam, as his was for six days over a similar country, to which he gives the generic name of Enárea. As to the application of the name "Enárea," see page 57, *sq.* of this Essay.

its real size; and, indeed, while he says that the Abáí had to be swum over, he admits that the Malég itself was crossed *at a ford*. But this could hardly have been the case had it been the Dedhésa, which is a river having deep water throughout the whole year; since even the Yabús, which is only a tributary of it, is not fordable, but must be crossed by swimming or on rafts.* Besides which, had Fernandes really crossed so large a river as the Dedhésa, he would hardly have failed to mention his having *recrossed* it, which he must necessarily have done before entering Enárea.

There is yet another reason for questioning the identity of the Malég with the Dedhésa; namely, that at the time when Abessinia was first visited by the Portuguese, the western arm of the Bahr el Azrek was well known to them as the Takui (Tacuy),† such being the name which that river then bore among the Abessinians. If, therefore, the river crossed by Fernandes had been the Takui, he would assuredly have called it by that name, and not by that of "Malég." That the two rivers should have got confounded with one another in our maps, arose doubtless from some misconception on the part, not of the Jesuit missionaries in Abessinia themselves, but of those of their Order in Europe who compiled the accounts of their travels; and the clue to it is possibly furnished by the map of the upper course of the Abáí in Tellez's work.‡ In this map is shown a small portion of the lower course of the "Tacuy," joining the Abáí on its *left* bank, against which is placed the name "Rio Tacaze." Now, supposing the designer of this map, who had the earlier Portuguese maps before him, to have written "Rio Tacaze" instead of "Rio Tacuy" by merely a clerical error, it would have been perfectly natural for another person copying this map, but not having access to the original documents and knowing nothing of the "Tacuy," to imagine that the word "Tacaze" was not so much an error in the spelling of the name as a mistake in inserting the name itself against the wrong river, inasmuch as the "Tacaze" would have been well known to him as a tributary of the Abáí on its *right* and not on its left bank. He would consequently have felt himself warranted in striking the name out. The Takui would thus have been left in the map without a name; and as the Malég is not shown in it at all (probably from its not being of sufficient importance), the next step in error would have been to place the name without a river against the river without a name.

The identification of the Malég with one of the smaller tributaries of the Abáí, most probably bearing in the present day a

* Cailliaud, vol. iii. p. 47.

† De Barros, 'Asia,' vol. iii. part i. p. 373, cited at length in page 29 of this Essay.

‡ "Figura de como o Nilo nasce e saye de Ethiopia," at p. 10.

Galla designation—as the Takui does in its actual name of Dedhésa—must be left to the researches of future travellers.*

Having thus traced the Abáí throughout its entire course, and being again brought back to its confluence with the Baħr el Azrek, we have next to proceed to the consideration of this latter river. The facts which have been already adduced† with reference to M. Russegger's observation of the mountainous country on its right or eastern bank, are sufficient to prove, that, above the point where it is joined by the Abáí, the course of the Baħr el Azrek has the same general direction that it is known to take lower down; that is to say, from S. to N. And from the consideration of those facts, and from the information collected in Abessinia by M. d'Abbadie and myself respecting the Dedhésa, there can no longer exist any doubt as to that river's being the direct upper course of the Baħr el Azrek, or Blue River, the confluence with it of the Abáí, or Hessén, taking place, as is already stated, in about 11° N. lat.

The course of the Dedhésa was first approximately laid down by myself. In connexion with the discovery of this river I may be allowed to enter into the following details. When in Gódjam in 1842, I obtained positive information of the existence of a river of large size joining the Abáí to the west of Shinasha, which river, from various considerations,‡ I was induced to regard not merely

* On the assumption that the name *Nile* is of Ethiopian origin, and ought consequently to be traceable in the native appellation of some one of the principal tributaries of that river, M. d'Abbadie attempts to derive that word from the name Didedsa (Dedhésa). The steps of this etymological *tour de force* are as follows:—Didedsa—Dides—Liles—Niles—Nilus! See 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 109. But the fact appears to have been overlooked that "Dedhésa" is a *modern* name, like Berésá, Wurgésá, &c., and many others, which, since the Galla invasion, have superseded the original native names.

† See page 11, *sq.*

‡ One of these considerations, as is stated in my letter of the 6th September, 1842, was the evidence of Mr. English, already cited in page 10, *sq.*, as to the source of the Baħr el Azrek's being situate far to the south of Abessinia. Another, as is also mentioned in that letter, was the assertion of Mr. McQueen, in p. 236 of his 'Geographical Survey of Africa' (which work I had with me in Abessinia), that Mr. English "most pointedly states, from a personal knowledge, and even ocular demonstration of the fact, that the Baħr el Abiad began (23rd April) to rise one month before the Baħr el Azrek;" it being repeated in the same page, that "the rise of the Baħr el Abiad at its junction with the Blue river commences in the month of April." This would make the flooding of the Baħr el Azrek, at the same spot, to commence some time in the month of May. But from my personal experience of three years,—in a tropical climate as good as three centuries,—the flooding of the Abáí does not begin in Abessinia till about the summer solstice (June 21). And as a month or perhaps more before that time the Baħr el Azrek was alleged to begin to rise at Kharţúm, 500 miles lower down the stream, the only conclusion that could be drawn from the premises was, that the western arm of the Baħr el Azrek must have its source very much further to the south; and as the basin of this arm was thus made to extend so far to the south as to coincide with that of the Gibbe (Zebéé) and Gódjeb, there was no alternative but to regard all those rivers as belonging to one hydrographical system. Since my return to England, however, I have ascertained, from a reference to Mr. English's original work ('A Narrative of the Expedition to Don-

as the direct stream of the Baḥr el Azreḳ, but as the recipient of all the waters of the countries to the S. of Gódjam as far as Enárea, Káffa, and Yángaro, and even further on. In accordance with this hypothesis I sketched a map of those countries, in which this river was laid down as forming the lower course of the Gódjeb (the connexion of which latter river *with the Nile, and not with the Indian Ocean*, I had then ascertained), and as having the Gíbbe, *the Dedhésa*, the Báro, and the Gába as its tributaries. This map was dated the 6th of September, 1842, as was likewise a letter addressed to the Rev. J. M. Trew, then Secretary to the African Civilization Society and now Archdeacon of the Bahamas, in which my reasons were given for its delineation in that form; and on the 19th of October the two, together with several other letters and maps, were despatched to Captain, now Major Sir William Cornwallis Harris, the British envoy in Shoa, for transmission to England. They reached his hands prior to the 11th of November following, on which day he wrote to me acknowledging their receipt; but they did not arrive in London till more than six months afterwards, namely, on the 13th of May, 1843.* By Mr. Stokes, Mr. Trew's successor as Secretary to the African Civilization Society, these documents were in part published in the 'Friend of the African' for June and July, 1843,† and then delivered over to Colonel Jackson, the Secretary of the Royal Geographical Society, Mr. McQueen having first been allowed,

gola, &c.'), that the time of the flooding of the Baḥr el Abyaḍ has been misstated by Mr. McQueen. The American traveller gives no date whatever of the Christian calendar; but he says (pp. 144, 146), "During our stay opposite Halfya [Halfyah], the Nile, *on the night of the 23rd [Sha'bán]*, rose suddenly about two feet. . . . This overflowing of the Nile was occasioned by the rise of the Bahur el Abiud, which, this year at least, commenced its augmentation nearly a month sooner than the Nile" (that is, the Baḥr el Azreḳ). Now the 23rd Sha'bán, in the year 1236 of the Hídjrah, corresponds, not with the 23rd April, as asserted by Mr. McQueen, but with the 24th May, 1821; and this date is confirmed by M. Cailliaud, who states expressly (vol. ii. p. 191) that the river at Halfyah "rose eight centimètres *during the night of the 24th May*." Hence the flooding of the Baḥr el Azreḳ would take place, not some time in May, but *towards the middle of June*; and consequently all my arguments, founded on the assumption of the rise of this river in Sennár one month earlier than the Abáí in Abessinia, fall to the ground. And, in fact, Mr. English, in a subsequent part of his work (p. 165), states that the Baḥr el Azreḳ "lost its transparency" on the 10th of Ramaḍán (= 11th June, 1821), and that "the day that presents the river troubled marks the commencement of its augmentation." This slight precedence of the flooding of the direct stream of the Baḥr el Azreḳ before that of its Abessinian branch, is accounted for by the fact, that the first waters troubled are those of the Dedhésa, the sources of which river lie about two degrees to the south of the Abáí.

* This is not stated with a view to impute to Sir William C. Harris any neglect in the transmission of my letters, but simply for the purpose of explaining how it happened, that the one in question had not been communicated to the Royal Geographical Society when I arrived in England, more than a twelvemonth after it was written. There doubtless existed a sufficient cause for the lapse of time which occurred between its receipt in Shoa and its arrival in London.

† Vol. i. p. 14, *sqq.*; and p. 27, *sqq.*

as a matter of favour, to inspect and take copies of them.* When my papers reached Colonel Jackson's hands, it was already too late in the season for him to make any use of them, so that they lay by till my own arrival in London in the month of October following. As, subsequently to the transmission of these documents, I had collected much additional information in Abessinia, I immediately began preparing a memoir, which was dated the 23rd of November, 1843, 'On the Countries South of Abessinia,' in which that subsequent information was incorporated, and which I requested might be substituted for the previous one of the 6th of September, 1842. This being permitted, the substituted communication was read before the Royal Geographical Society early in the next season, namely, on the 11th of December, 1843, and published, with a map, in the fourteenth volume of the Society's 'Journal.'

This explanation is due both to the Royal Geographical Society and to myself, on account of my previous letter and map of the 6th of September, 1842, which are still in the archives of the Society, having been brought to public notice by individuals through whose hands they passed before they came into the Society's possession—namely, by Sir William C. Harris in the 'Introduction' to the second edition of his 'Highlands of Æthiopia,'† and by Mr. McQueen in an article on African Geography in 'Blackwood's Magazine' for June 1844;‡ from both of whom my opinion that *the Gódjeb joins the Nile instead of flowing into the Indian Ocean* (as I was myself the first to imagine, but in error§), has met with express condemnation.

Returning to the consideration of the Dedhésa, it is remarkable that the existence of this western arm of the Blue River should have been recorded upwards of two centuries ago by de Barros;|| and yet, by some fatality, that writer's most accurate description of it should have been altogether disregarded. He says, "With

* 'Friend of the African,' vol. i., p. 27; and 'Blackwood's Magazine,' vol. lv. p. 739. Mr. McQueen is mistaken in saying that I "received some pecuniary assistance from the African Civilization Society," of which he was a member.

† "I have ascertained that the Gochob [Gódjeb] does not flow to the Nile, *as it is made to do in a map which I have seen*, constructed by one of the reviewer's greatest authorities."—vol. i. p. xxiv. The review here alluded to is one of Major Harris's work, in the 'Westminster Review' for March, 1844, vol. xli. pp. 183, *seqq.* 619, *seqq.*

‡ "Amongst the maps there was one of the countries to the south of the Abay, including Enares, Kaffa, and Gingiro, constructed at and sent from Yaush in Gojjam, September 6, 1842, together with some of the authorities on which it had been made. . . . The whole delineation, a copy of which I preserved, presented a mass so contrary to all other authorities, ancient and modern, that to rectify or reduce it to order was found impracticable, or where attempted only tended to lead into error."—vol. lv. p. 739.

§ See 'Information respecting the Countries S.W. of Shoa,' in 'Journal R. G. S.,' vol. xii. p. 87; and 'A Statement of Facts relative to the Transactions between the Writer and the late British Political Mission to the Court of Shoa,' p. 7.

|| 'Asia,' decad. iii. fol. 83, Lib. 1628; vol. iii. part i. p. 370, edit. 1778-83.

respect to what we have learned concerning the territories of the Emperor of Ethiopia, the same lie between the streams of the rivers Nile, Astaboras, and Astapus, which Ptolemy describes in his fourth table of Africa. These rivers the natives call Tacuy [Takui], Abavy [Abáwi or Abái], and Tagazy [Tákkazie]; of which they regard the central one as the largest, and for this reason they give it the name it bears, which signifies 'the father of rivers.'* It issues from the lake which Ptolemy calls Coloë and the natives Barcena" [Baħr Tsána]. And further on he says,† "The three rivers which water this country are not at their sources sufficiently large to irrigate the land of Egypt, but they are aided by the waters of other very considerable rivers. For the most eastern one, which is named Tagazy, receives seven streams; the second one, named Abavy, eight; and the Tacuy four, which have their rise in the mountains of Damut, Bizamo, and Sinazy,‡ independently of others which join it before it arrives thus far."

The only objection that might possibly be raised to this identification of the Takui with the Dedhésa or Baħr el Azreḡ is, that by that river de Barros must be understood as referring to the *Baħr el Abyad*. But this objection has already been met by the learned d'Anville; not, indeed, with reference to the Takui, which river would appear not to have been known to him, but with respect to the "Malég" of the maps, which is, however, substantially the same thing. That distinguished geographer, in his 'Dissertation sur les Sources du Nil, pour prouver qu'on ne les a pas encore découvertes,' § pointedly notices the ignorance of the Abessinians with respect to all countries beyond their own immediate limits, as instanced in the conquest made, in the year 1613, by Ras Sela Kristos, of the neighbouring districts of Wámbera and Fazóḡl, which before that time were unknown to them. || Now, if in the year 1613, the valley of the Baħr el Azreḡ itself was so utterly unknown to the Abessinians that it should be called by them the New World, it is not to be imagined that de Barros,

* But in another place (ibid., p. 371) he says that the Abái was so called by the Abessinians, only because they had never seen the Takui, i.e. the pseudo-Nilus. See page 30, note.

† 'Asia,' vol. iii. part. i. p. 373.

‡ Pronounced "Sínashí." In the Amhara and Gafat languages the country is called Shínasha; in Agáwi Tzintzi; and by the natives themselves Sínicho.

§ "Les Abissins eux-mêmes paroissent ignorer ce qui s'éloigne de leurs limites. On lit, dans le P. Jérónimo Lobo, que Ras Sêla Christos, général des troupes de Négua Segued, voulant en 1615 [1613] porter la guerre dans les pays qui confinent à l'Abissinie vers le couchant, étonné de leur vaste étendue, les désigna par le nom d'*Adis Alem*, qui signifie un nouveau Monde."—'Mémoires de l'Académie Royale des Inscriptions et Belles Lettres,' vol. xxvi. (1759) p. 62, sq.

|| "Regnumque utpotè incognitum et ob vastitatem vocavit Ayzolam [Hadis Alem] id est novum mundum." Paen, in Kircher's 'Œdipus Ægyptiacus,' Syntagma I. cap. vii. p. 59.

whose information, derived from Abessinian sources, was of a much earlier date,* should refer to the far more distant Bahr el Abyad under the name of Takui.† But there is even a more conclusive answer to such an objection. It is, that the position attributed by the Portuguese writer to the sources of the tributaries of the Takui, in the mountains of Dámot,‡ Bizámo, and Shínasha, fixes the precise locality of that river; determines the total want of connexion between it and the Bahr el Abyad, and establishes its identity with the Dedhása and with M. Russegger's upper course of the Bahr el Azrek, beyond the possibility of question.

In my memoir of the 13th of November, 1843, and the map accompanying it, are given various particulars respecting the Dedhása, which have since been confirmed in a most striking manner by M. d'Abbadie, in a letter written from Gódjam, in April, 1844.§ after his return from Enárea and Káffa. Of course, the details which M. d'Abbadie has it in his power to give must, in a great measure, supersede the previous information collected by me. Still, I may be allowed to observe that my map, which was composed from oral information obtained in Gódjam, is proved by that traveller to be substantially and in many cases minutely correct, so as to serve as an illustration scarcely less to his letter than to my own memoir. It is from M. d'Abbadie's letter that the following particulars respecting the upper course of the Dedhása are extracted:—

Ascending the right bank of the Dedhása, the Angar, a river of note in this portion of Africa, is first come to: it separates the Galla district of Horro from that of A'muru.¶ Above the Angar the Dedhása is joined by the Wurgésa,¶¶ the Walmay,** and the Bókak;†† and still higher up, in the desert of Sédecho, by the Aétu, and then by three other rivers, which carry to it the waters

* He died on the 20th October, 1570. See his *Life*, prefixed to the Lisbon edition (1778) of his 'Asia,' vol. i. p. lvii.

† In one passage de Barros says that the Abessinians call the Nile "Toavy;" but the context shows that this is merely a misprint for "Tacuy:—" ". . . as correntes do rio Nilo, que elles chamão Toavy [Tacuy], de que elles tem somente noticia sem uso de suas aguas, por razão das grandes serranias de Damud, e Sinazy se metterem entre elles, e elle. E daqui vem chamarem elles ao rio Abavy, pai das aguas, por não verem as do Nilo."—vol. iii. part i. p. 371.

‡ This is the ancient Damot, south of the Abdi, as shown in the maps of the Portuguese, and not the modern province of that name in the south-west of the peninsula of Góljám.

§ 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 107, sqq.

¶ In my MS. notes I find recorded the river Hángar, as running between A'hole in Horro, and Túllo Kisto in A'muru. This is manifestly the A'aker (Anquer) of the maps of the Portuguese; and it affords a yet further proof of the identity of the Dedhása with the Takui.

¶¶ M. Tutschek, in his 'Galla Dictionary,' (8vo. Munich, 1844) p. xiii., mentions a young Galla, named O'chu Aga, who came from "Urgeza in Siba." The position precisely corresponds.

** In my map Walmáa.

†† In my map Bókak.

of the kingdom of Géra. The head of the Dedhésa is situate in about 8° N. lat. and 75 miles to the W. of Sákka,* the capital of Enárea. It rises in a swampy meadow or sort of marsh, situate on the same plateau which gives rise to the rivers Báro, Gándji, Náso, and Gódjeb—all tributaries to the White River. Leaving on its left bank the kingdom of Gúma, from which it receives the Múllu, the Dedhésa first runs in a direction nearly E.; but on reaching the heights of Kóchau,† in the kingdom of Limmu or Enárea, it turns round sharply to the N., separating that kingdom from the adjoining one of Gúma. Its course is here very winding, and in the dry season it is easily forded. Below Gúma it is joined on the left bank by the greater and lesser Sidan, the Chára, and the Dábana.‡

Thus far M. d'Abbadie. From information obtained by myself, there is a noted ford over the Dedhésa on the caravan-road to Túmhe, the country from which is brought to the market of Báso,§ in Gódjam, the *Korartma* || (called by the Arab traders *Kheil*,¶ the “Chéle” of Rüppell**), a sort of cardamom,‡‡ which is exported from Maşówah to India in some quantity. The name of this ford is Mélka-Kwóya,‡‡ apparently the same, with a dialectic variation, as that of the Melka-Kúya over the Hawásh, on the road between Tadjúrrah and Shoa. The country on the left bank of the Dedhésa, which comprises the districts of Búnno, Túmhe, and Djímma-Dábo (or Dápo), is, among the Gallas who frequent the market of Báso, usually designated by the generic name of Wallégga. It is inhabited by numerous independent Galla tribes, and stretches out westwards in vast grassy plains, which form the elephant-hunting grounds of the Gallas of Gúderu. §§ The ivory is brought by them for sale to Báso, from

* My position of the source is 7° 40' N. lat., and 40' W. of Sákka.

† “La hauteur de Kotchao.” By this I understand the Abessinian expression *áfaf*, which means, not a mountain, but *the edge of the table-land*, over which the river precipitates itself into a deep ravine.

‡ In my MS. notes there are several routes in which the Dábana is mentioned, whence I conclude that it is a river of some magnitude.

§ See an account of this market in the ‘Friend of the African’ (1843), vol. i. p. 134, *seq.*, p. 145, *seq.*; vol. ii. p. 7, *seq.*

|| ‘Journal R. G. S.’ vol. xiii. p. 263.

¶ *Khil* of the Arabic lexicons. The word “*Khil*” is little used by the Arabs, and means, according to the Kámús, *Rue*, or rather *Paganum Harmakak*: it does not occur in Ibn Baiţár’s ‘Materia Medica.’ Nothing, however, is more uncertain than the real value of Arab names of plants, and several different plants had doubtless the same name.—F. S.

** ‘Reise in Abyssinien,’ vol. i. p. 193.

‡‡ The *Cardamomum majus* of Cordus. In Dr. Pereira’s ‘Materia Medica’ (2nd edit.), p. 1026, it is figured as “Madagascar Cardamom;” the *Cardamomum maximum* of Matthiolum, and the *Anomum angustifolium* of Sonnerat and Smith. At Báso I was informed that it is the produce of the districts beyond Túmbe, that is to say, to the south and west of that country. [See, on this subject, the ‘Pharmaceutical Journal’ of April and May, 1847, vol. vi. p. 466, *seq.*, and p. 511, *seq.*]

‡‡ *Mélka*, in the Galla language, means “ford.”

§§ ‘Journal R. G. S.’ vol. xiii. pp. 255, 268.

whence it is carried to Maḡówah, and thence exported to India. In the lower portion of its course the Dedhása flows through a desert tract called Hándak,* at a short distance to the west of Límму-Sóbo, the country of M. Jomard's Galla, Wáre.†

M. d'Abbadie is inclined to the opinion that the Dedhása is identical with the Túmat.‡ The same opinion was expressed by myself in my letter of the 6th September, 1842;§ but from what is stated in the preceding pages this opinion is manifestly untenable. Lower down, in about 10° 14' N. lat. according to M. Russegger,|| the Dedhása, which has here acquired the name of the Baḡr el Azreḡ, receives on its left bank the Yábús, a river well known to us from the reports of the Europeans who have ascended the former in company with the troops of the Páshá of Egypt. The Yábús is a considerable river, having much water throughout the year. It is not fordable, being crossed either by swimming or on rafts;¶ but, according to Russegger,** it is far from having the length attributed to it by Cailliaud. M. Russegger calls this stream the *Inbúss*. Among my MS. notes of information obtained in Gódjam, I find mention of a river in this direction called the *Dabús*. All these are evidently but different forms of the same name. Among the Shánkawas, or Bérta negroes, whose pronunciation is exceedingly thick and inarticulate,†† the native name would appear to commence with an indistinct nasal sound, common to many African languages—*N'bús*—from which has been made the Yábús of the maps, but which M. Russegger would represent by *Inbúss*; while, from the ready permutation of the letters *n* and *d*, it takes the form of *Dabús* in the mouths of the Gallas, from some of whom I heard of it.

At about 60 or 70 miles below the "*N'bús*," the Baḡr el Azreḡ is joined by the Túmat, a river of much less importance

* Khandak means "a foss or dyke" in Arabic.—F. S.

† 'Journal R. G. S.,' vol. xiii. p. 256.

‡ "Un homme de Sibou nous ayant assuré avoir vu la jonction du Abbaya avec le Dideaa, nous croirions pouvoir identifier ce dernier avec le Tumat de M. Cailliaud."—'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 110. "Le Dideaa paraît être le Toumat de M. Cailliaud, mais je n'ose encore l'affirmer."—'Bulletin,' 3rd Series, vol. iii. p. 136.

§ That is to say, I imagined the Túmat to be the lower course of the western arm of the Baḡr el Azreḡ. See 'Blackwood's Magazine,' vol. lv. p. 739. In my Memoir of the 13th November, 1843, I looked upon the Yábús as being the lower course of the Dedhása, which was still an error, though but little removed from the truth, since the two rivers have a common channel for about 45 miles. before they are joined by the Abáii. || 'Reise, &c.,' vol. ii. part ii. p. 552. ¶ Cailliaud, vol. iii. p. 47.

** In a small pamphlet from which I made some extracts previously to my departure from England in 1840, but to which I have lost the reference. I apprehend it must be the 'Wissenschaftliche Beobachtungen, &c.,' referred to by M. Jomard in his 'Observations sur le Voyage au Darfour,' p. 73. I have made inquiries after this pamphlet in Germany, but in vain.

†† See a Vocabulary of their language in the 'Proceedings of the Philological Society,' vol. ii. pp. 94 and 97, *seqq.*

than the former. When M. Cailliaud visited the Túmat in the beginning of January, 1842, he found it in great part dry, its bed meandering through an extensive plain.* He adds that it has water throughout the whole year; but on this point he disagrees with M. Weingartshofer,† an Austrian gentleman, formerly in the medical service of Ahmed Páshá, the late governor of Sennár, who informed me that the Egyptian troops call the Yabús a *baħr*, or *nahr*, that is to say, a river flowing in all seasons, while the Túmat is only a *khór*, or the valley of a winter brook.‡ And this is confirmed by Linant,§ as well as by Russegger, who says that in the dry season the Túmat has no water at Fázókl, its bed being sandy; but that in the country of Bérta, where it is rocky, the river has water at all times of the year. || M. Russegger adds that "the Túmat comes from the S., and has its origin in the innumerable mountain-torrents between Singe and Fázókl. Consequently, it has not half the length attributed to it by Cailliaud." The error of the French traveller appears to arise from his considering the Túmat to be the lower course of the Malég of the maps.

As below the Túmat the Baħr el Azreħ, or Blue River, is joined only by insignificant wádis or winter-torrents undeserving of mention, we are once more brought to its confluence at Kharṭúm with the Baħr el Abyaḍ, or White River. Before entering upon the particular investigation of this latter river, it is proper that we should discuss the much-agitated question of the relative importance of the Baħr el Abyaḍ and Baħr el Azreħ, and of their respective right to be considered as the parent stream.

Whatever difference of opinion may heretofore have existed on this subject, the expeditions which have ascended the Baħr el Abyaḍ by order of the Páshá of Egypt, must be considered as having set the matter finally at rest, so far at least as regards magnitude, by proving the immense superiority of this river over

* Vol. ii. p. 366.

† It is to this traveller that I am indebted for the information respecting the Páshá of Sennár's "Slave-Hunt" in 1843, published in the 'Friend of the African,' vol. i. p. 107, *seqq.*, and also for the account of the forced march of a slave caravan across the Nubian Desert, given in p. 120 of the same volume.

‡ "Khor, ein Regenstrom, ein Regenbach, Torrent."—Russegger, vol. ii. part ii. p. 510. [According to the Arabian lexicographers, *baħr*, properly the sea, or a very large lake, such as the Caspian, is also used for a very large river, such as the Nile: *nahr* is the general term for river; and *khór* (properly *khaur*) means a valley between high mountains, the mouth of a river, and a bay or gulf of the sea: the latter is the sense in which it is commonly used by Arab writers. *Wádi* (in an abbreviated form, *wadd*, sometimes pronounced *wédd*) signifies any narrow valley, and the bed of a torrent at some seasons dry.—F. S.]

§ 'Journal R. G. S.,' vol. ii. p. 185.

|| On the 5th January, 1838, M. Russegger encamped near Fázókl, in the dry bed of this river. By digging a foot deep in the sand water was found. See 'Reise, &c.,' vol. ii. part ii. p. 551, *sq.*

its better-known Abessinian branch. As, however, some persons may still entertain the opinion that the Bahr el Azrek, though the smaller stream, ought to be regarded as properly the upper course of the river of Egypt, we will proceed to consider what real grounds there are for entertaining such an opinion.

Dr. Murray, the able and ingenuous commentator and apologist of Bruce, at the same time that he admits that traveller to be in error in supposing the Bahr el Azrek to be the Nile of the ancients, adduces arguments in excuse, if not in defence, of this error, which deserve to be reproduced. In a note on the remark in Bruce's MS. Journal that "the Nile is still at Halfaia [*i. e.* 9 miles below the junction] called El Azergue [Azrek], not the Nile," Dr. Murray observes,* "The name of the Abyssinian branch extended to the united stream either insinuates that the colour of the Abay is still retained by the river, a circumstance which, considering the superior mass of the western waters, white with mud,† is not very probable; or that the river is still considered as a continuation of the Abyssinian branch, and consequently retains the name of its original. All the Arabs, from Fazuclo to the junction, know the river of Habbesh by the name Bahr el Azrek. If they give this appellation to the river after it has joined a larger branch, it is plain they consider the larger branch as received into the smaller, not the smaller as received into it. It is the straight course which determines these unlettered savages. Many similar instances occur within our own island of rivers being called after the inferior branch, because they run straight on in its direction; while the greater torrents that rise in more elevated grounds are forgotten in the course of these, because they join them in an angular position. That the Bahr el Abiad deserves, from its importance, to be reckoned the principal source of the river of Egypt is not to be doubted; that Herodotus and Ptolemy, who led their translators, the Asiatic Arabs, considered it as such is evident; but the natives of Habbesh, Sennaar, and Atbara seem to dispute these facts so generally that Mr. Bruce may surely be excused in following their opinion."

This reasoning, ingenious as it is, is, nevertheless, without any real foundation. If the "straight course" and "the name Bahr el Azrek" are to give an inferior branch a claim to the title of "the Nile," to the prejudice of the larger stream, then is *the Dédhésa* entitled to that distinction, since, as has been shown in a former part of this Essay,‡ it is that river and not the Abâi, the river visited and described by the Portuguese Jesuits and after them by Bruce, which answers to these two conditions. But

* 'Life of Bruce,' (4to. edit.) p. 429.

† Is it not rather that the colour of the Bahr el Abiad arises from the comparative absence of mud in its waters?

‡ Page 26, *sqq.*

without attempting to evade the question by a side argument like this, we will at once take higher ground, and show that Dr. Murray is mistaken as to the fact both of the Bahr el Azrek's being *generally recognised by the natives* as the parent stream, and also of its being the *direct* continuation of the Nile.

Our first authority is M. Russegger, who states as follows:—“Many travellers make a distinction between the *White Nile* and the *Blue Nile*, designations of which the natives know nothing. Independently of the Arabic names ‘Bahr el Azrek’ and ‘Bahr el Abyad’—the *Blue and White Rivers*—they apply the name of ‘the Nile,’ absolutely, to the *White River*, as being the more important of the two large streams, but never to the *Blue River*, which they regard merely as a stream of minor importance, like the *Tákkazie*.”* And again:—“The principal arm of the Nile is the Bahr el Abyad, which is therefore very often called by the natives ‘the Nile,’ *a name which they never use in speaking of the Blue River*. They look upon the latter as altogether a subordinate stream. And this opinion is, in a manner, quite in accordance with nature; for, *whether as regards the direction of its course or its volume of water*, the Bahr el Abyad is a stream of considerably greater importance than the Bahr el Azrek.”†

Mr. Inglish corroborates this opinion, and states further that by the natives of Sennár the Bahr el Azrek is called *Adit*, and that it “enters the Bahar el Abiud *nearly at right angles*; but such is the mass of the latter river that the Nile [*i. e.* the *Adit*] cannot mingle its waters with those of the Bahar el Abiud for many miles below their junction.” And again: “At the point of junction between the Bahar el Abiud and the *Adit*, the Bahar el Abiud is almost barred across by an island and a reef of rocks; this barrier checks its current, *otherwise it would probably almost arrest the current of the Adit*. It is, nevertheless, sufficiently strong to prevent the *Adit* from mingling with it immediately, although the current of the *Adit* is very strong, *and enters the Bahar el Abiud nearly at right angles*.”‡ On the other hand, M. Cailliaud, in speaking of the Bahr el Abyad above the junction, observes that,§ “for the first 2 leagues it appears to run about S. 45° W., *forming a straight line with the Nile in the same direction*.” And again:|| “The direction of the *White River* is almost S.W., and consequently, as I have already stated, *it runs in one line with the Nile N. of the Blue River*.”

That at the present day the natives of Abessinia regard their river, the Abáí, as the Nile, will be conceded; but they likewise

* ‘Reise, &c.,’ vol. ii. part i. p. 515.

† Ibid., vol. ii. part ii. p. 82.

‡ ‘Narrative of an Expedition to Dongola,’ p. 196.

§ ‘Voyage à Méroë, &c.,’ vol. ii. p. 198.

|| Ibid., vol. iii. p. 94.

believe it to be the Gihon of Genesis! But the ancient Axumites evidently thought differently, and if they knew the Abáï at all (which may be doubted), they looked on it only as a tributary of *their* river, the Tákkazie,* which latter was considered by them to be the upper course of the Nile.† This is proved by the second Adulitic Inscription of Cosmas Indicopleustes, in which the province of Sámiën (Samen), immediately to the W. of the Tákkazie, is described as being "beyond the Nile."‡ And, in fact, as we proceed up the river, we shall find that the native population dwelling on the banks of any branch on either side assert their own river to be the head of the main stream, simply because they are ignorant (as the Abessinians in particular are known to have always been §) of the existence of any larger river of which it is a tributary. || What we require is the testimony of the natives dwelling *between the two streams*, and thus possessing a knowledge

* *Tákkazie*, in the Gêez or ancient Ethiopic language, is not a proper name, but an appellative signifying "river;" e. g. ጥሕ : ግዞ : *Tákkazie Gëyon*, the river Gihon, i. e. the Nile; ጥሕ : ጠገሕ : *Tákkazie Tiégré*, the river Tigris. Thus the Tákkazie of Abessinia was the river, ሕዳሕ ስጋሕ. (See Ludolf, 'Lexicon Æthiopicum,' *sub voc.* ጥሕ : and Dr. Murray's note, in vol. iv. p. 349, of the second edition of Bruce's 'Travels.') Accordingly, in the Ethiopic version of the Scriptures, the river (ጥሕ) whose waters were turned into blood by Moses (Exod. vii. 15-25) is called *Tákkazi*.

As to the meaning of the ጥ of the Hebrew text, see 'Origines Biblicæ,' vol. i. p. 280; and 'Asiatic Journal,' vol. xvii. (1835) p. 93, sq.

† The Emperor Lalibala is celebrated in Abessinian and Arabian history for a successful attempt which he is said to have made to turn the course of the Nile. On this subject Mr. Salt remarks ('Voyage to Abyssinia,' p. 473, note), "The ignorance of the times may have favoured the opinion of the possibility of such an undertaking, but in all probability the only source of a river over which Lalibala had a command was that of the Tacazze [*Tákkazie*], which takes its origin in Lasta." Without expressing any opinion as to the practicability of the undertaking thus imputed to Lalibala, I may remark that, from what is above stated, it is manifest that the "Nile" of that monarch was the Tákkazie. It is even not improbable that it was the *eastern* arm of that river, now known as the Tselári.

‡ "After this I reduced Ava and Tiamo or Tsiamo, Gambéla and the country round it, Zingabéné, Angabé, Tiama, and the A'thagai, Káláa, and Seménè, a nation beyond the Nile—*ἵσταντο ἱπὸς ῥίαν τοῦ Νείλου*—among mountains difficult of access and covered with snow; in all this region there is hail and frost, and snow so deep that the troops sunk up to their knees. I passed the River [to attack these nations], and subdued them"—*εἰς ποταμὸν ἠαῦτα, ὀρίαντα*."—Cosmas, in Fabricius, 'Bibliotheca Græca,' lib. iii. c. 25, § 32: vol. ii., 1716, p. 606; and Vincent's 'Commerce of the Ancients,' vol. ii. p. 541, sq. There can be no question as to the fact that the *Tákkazie* is here meant.

§ See page 29 of this Essay. M. d'Abbadie remarks, in a letter published in the 'Athenæum,' No. 918, of May 3rd, 1845, p. 542, "I admit that all Abyssines name the Abbey as the principal branch of the Nile, but this is from sheer ignorance, since they maintain, at the same time, that were the Abbey made to flow through Shawa [Shoa] into the basin of the Hawash, Egyptian harvests would perish by drought."

|| Even when some of them had become acquainted with the existence of a larger arm, they would of course see no reason to alter their nomenclature. Thus, it is quite consistent that the people of Sennár should continue to call the river on which that town lies, the "Nile," (English says they call it the *Adit*), though the merchants of that town know the Bahr el Abyad to be the much larger stream of the two. See Burckhardt, 'Travels in Nubia,' p. 350, sq.

of *both*; and upon this point M. Russegger's statement above cited is conclusive.

If, on the other hand, we appeal to the testimony of former ages, we shall arrive at precisely the same result. The opinions of the ancients on this interesting question have been so ably discussed by d'Anville, in his '*Mémoire sur le Nil*,'* that it would be a work of supererogation to make any further statement here. All, therefore, that is necessary is to refer to the work of that learned writer, with the remark that, as to him is due the merit of having first laid down the course of the Baħr el Abyaḍ, in a manner which subsequent positive information has shown to be substantially, indeed almost minutely accurate, so likewise has he that of having demonstrated that this river is the *Nile* of Ptolemy.

There is only one other point remaining to be adverted to, which is the fact, irrespective of all opinions, that the Baħr el Abyaḍ is by far the larger river. From the extracts from Bruce's MS. Journals, which were published by Dr. Murray, we have that traveller's testimony that the Baħr el Abyaḍ is of much greater magnitude than the rival stream:—"The Abiad river is three times as big as the Azrek (Nile)."† And M. Linant, who, in the year 1827, ascended the former river as far as Al-leis, records that "the Baħr-Abiad is undoubtedly the principal of the two rivers which form, by their junction, the Nile of Egypt. It discharges a greater volume of water than the Baħr-Azrek; and, although somewhat narrower immediately at the confluence than it is higher up, it is, even in this respect, equal to the Blue River. The colour of its waters is also that which characterizes the conjunct stream in the dry season."‡ The evidence of Cailliaud, English, and Russegger might likewise be adduced. But we stand in no need of individual testimony to prove what, in the present day, is an established and notorious fact. The recent explorations of M. d'Arnaud and his companions for 1000 miles above the point where the Baħr el Abyaḍ is joined by the Baħr el Azrek, have irrevocably determined that the former is by far the larger river. And it must be borne in mind, that, above 9° 30' N. lat., the stream which they thus navigated is only *one of three*; for, in about that parallel, two arms branch off from the main stream, the Sobát or Téfi to the E. and the Baħr el Ghazál or Keiláh to the W., each of which is nearly, if not quite, as large as the central stream ascended by the Egyptian expeditions. Compared with such a river as this, the Baħr el Azrek, even with its two arms, the Dedhésa and the Abáï, sinks into comparative insignificance.

Whether, then, we consider the relative magnitudes of the two

* '*Mémoires de l'Académie Royale des Inscriptions et Belles Lettres*,' vol. xxvi.

† '*Life of Bruce*,' p. 418.

‡ '*Journal R. G. S.*,' vol. ii. p. 185.

rivers, the direction of their respective courses, or the volume of their waters; whether we regard the opinions of the ancient geographers, or those of modern travellers, or of natives acquainted with *both* streams—for the evidence of such as only know one is, of course, inadmissible;—the result is the same. In all and each of these points of view, the Bahr el Abyad, or White River, is the principal stream, and the Bahr el Azrek, or Blue River, is the subordinate or tributary. In pursuing our course, therefore, as is now requisite, up the former river, we may rest assured that we are ascending *the Nile*.

As far as Al-leis, in $13^{\circ} 43' N.$ lat., the main stream was ascended by M. Linant, as already mentioned. For our knowledge of its course above that point we are indebted to the three expeditions undertaken by command of the Viceroy of Egypt, between the years 1839 and 1842. Without pretending to enter into the details of these expeditions, it will be sufficient to say that the first reached as far as about $6^{\circ} 30' N.$ lat.—at the time erroneously stated to be as high as $3^{\circ} 35' N.$ lat.*—the second to $4^{\circ} 42' 42'' N.$ lat.† and $31^{\circ} 33'$ long. E. of Greenwich, and the third not quite so far. Of the second, which is thus seen to be the most important, the results have been partially made known by M. d'Arnaud, the scientific chief of the expedition, and pub-

* M. Werne says ('Blick in das Nil-Quellland,' p. 42; and 'Monatsberichte,' N. S., vol. ii. p. 16), "Die erste Expedition drang vor bis zum Lande der *Ehiab* ($6^{\circ} 30' n.$ B.) am 27 Januar 1840. Ihre astronomischen Berechnungen sind falsch, wenn sie den $3^{\circ} 35'$ angaben."

† In consequence of doubts having been expressed by M. Russeger in his 'Wissenschaftliche Beobachtungen,' p. 66, as to the geographical results obtained by M. d'Arnaud and his party, whom he imagined to have been unprovided with instruments for making the necessary observations, M. Jomard has made a formal declaration on the subject in his 'Observations sur le Voyage au Darfour' (8vo. Paris, 1845), p. 73, *seq.* He says, "The observations were made between the 19th November, 1840, and the 2nd February, 1841, and between the 5th February and the 1st June, being in number about eighty, between Kharšūm and the furthest point explored, and consisting of 39 on the voyage up the river (of which 28 were of latitude and 11 of longitude), and 43 on the return down. Those of longitude were by lunar distances and by the chronometer. The extreme point of the expedition, in $4^{\circ} 42' 42'' N.$ lat., is at the furthest extremity of the island of Jeankar, between the village of Waleny on the right bank of the Bahr el Abyad, that of Alacone on the left bank, and the mountains of Belenia and Korek towards the south. I could give (he adds) the names of the other places of observation. The instruments with which the observers were provided consisted of a reflecting circle, a chronometer by Bréguet, sextants with artificial horizons (mirrors and mercury), besides magnetic compasses, thermometers, barometers, hygrometers, &c."

In a letter dated the 23rd January last, M. Jomard informs me further that he is now in possession of M. d'Arnaud's detailed map of the river, three metres (nearly 10 feet English) in length, and that he has lately received the whole of the original observations, which are in course of calculation. The journal of the voyage is in three volumes, filled with sketches and sections of the valley of the river, made almost daily; besides numerous barometrical and meteorological observations.

I have felt it my duty to add this note, in consequence of the doubts respecting the extreme point reached by M. d'Arnaud, which were expressed at the Meeting of the Royal Geographical Society when this Paper was read.—13th February, 1847.

lished in the 'Bulletin' of the Geographical Society of Paris,* and by M. Werne in a memoir printed in the 'Allgemeine Preussische Zeitung,'† and reprinted by Professor Ritter in his 'Blick in das Nil-Quellland.'‡

From these accounts, and from the map which accompanies that of M. d'Arnaud, we collect that from the junction of the Baḥr el Azrek at Khartúm to about the 14th parallel of N. lat., the direction of the Baḥr el Abyad is about W.S.W.; above that point it continues almost S. to about 11° N. lat.; thence its general direction is to the S. W.; till in about 9° 10' it becomes due W.

According to our system of investigation, we must here quit the main stream, in order to consider the tributaries which it receives on its right bank between the parallels of 11° and 9° N. They are three, named respectively in M. d'Arnaud's map Pipar, Djal, and Sobát (Saubat). The first two are marked in the map as branches of the Sobát, and as forming with that river at its confluence with the Nile a delta of upwards of 100 miles each way; and, in conformity with this, M. d'Arnaud states that the Sobát "a encore deux dérivations assez considérables plus au nord."§ Were it not for this, I should be inclined to regard these two rivers as having no connexion with the Sobát above, but as being separate streams of no very long course, and probably running only during the rainy season. The Sobát itself was ascended by the second expedition for upwards of 80 miles in a direction about E.S.E., and it is described as contributing to the Nile nearly a moiety of its waters.|| It is called by the natives on its banks Téli and T'á, and by the Arabs Baḥr el Makádah, or the river of *Habesh*.¶

The most recent traveller in the countries south of Sennár is M. Castelli, who, in a letter from Dr. Perron of Cairo, dated the 3rd of September, 1845,** is stated to have penetrated, in com-

* Second Series, vol. xviii. p. 367, *seq.*; vol. xix. p. 89, *seq.*, and p. 445.

† No. 264, of 24th July, 1844.

‡ P. 42, *seq.* See also 'Monatsberichte,' N.S., vol. ii. p. 16, *seq.*

§ 'Bulletin,' vol. xix. p. 90.

|| *Ibid.*

¶ Werne, in 'Blick in das Nil-Quellland,' p. 47. By Selim Binbáshí, the commander of the first expedition, this river is named Baḥr el Sebát, or Sebát, and Chelfy, Telky, or Teláky ('Bulletin,' 2nd Series, vol. xviii. pp. 26, 171). This last

is evidently an error in writing $\int$ for $\int$; since not only M. Werne, but also M. Thibaut, who likewise accompanied the expedition, has Tel'í (*Ibid.*, p. 382). M. Thibaut attributes further to the Sobát the names of Blue River and Kety, which latter designation is given by M. Werne to the main stream of the Baḥr el Abyad. The officers of the first expedition describe the waters of the Sobát as of a reddish colour (*rougeâtre*), which however they go on to say is but little different from that of the White River itself (*Ibid.*, p. 171).

As to the application of the terms "Makádah" and "Habesh," see the *note* in page 2 of the present Essay.

** 'Bulletin,' 3rd Series, vol. iv. p. 65, *eq.*; 'Nouvelles Annales des Voyages,' 1845, vol. iv. p. 138.

pany with a body of Egyptian troops, as far as "the Sobát, at near the point where the Pipar and Sobát present a bifurcation;" consequently to about 9° N. lat. and 33° E. long. Here "the Sobát was crossed and then recrossed; and on the further march, *which was more directly towards the E.*, they had to cross the Sobát a good number of times, and likewise the Túmat." After a very winding road, the army reached Mount Dul, in about $8^{\circ} 35'$ N. lat., and about $35^{\circ} 10'$ E. long.; and from thence it returned to its point of departure.

It is to be regretted that the account of this journey hitherto furnished is so concise. Still, sufficient is stated to show that the "Sobát" which M. Castelli reached cannot be the upper course of "the river of Hábesb," which was ascended by M. d'Arnaud and his companions. For it is not to be conceived that the immense stream, which is described by the latter as "contributing to the Nile nearly a moiety of its waters," should have received no further notice from the former traveller than that it was "*crossed* a good number of times;" still less that a river which is stated to form a delta of 100 miles in extent, should have its source within another hundred miles of the apex of that delta: independently of which, we have (as will next be seen) evidence showing the position of the main stream *in a totally different direction*, namely, in the S.E. The reasonable conclusion is, that the Sobát of M. Castelli is some minor tributary of the Sobát or Téfi of the Egyptian expedition, which, among the Dinkas, has given its name to its recipient. The sources of this tributary are manifestly in the vicinity of those of the Yabús and Túmat (which latter river that traveller in like manner repeatedly crossed), that is to say, but approximately only, in about $9^{\circ} 30'$ N. lat. and 34° E. long.

Of the upper course of the main stream of the Sobát or Téfi, we are not furnished with any further particulars by the officers of the Egyptian expeditions. It is to other sources that we must look for this information. And first we are told by M. Russegger* that three days to the S. of Singe, which place that traveller afterwards found to be in $10^{\circ} 16'$ N. lat., is Fadassi on the left bank of the Yabús; and three days beyond that is Lerha, the residence of the Galla chief Werkholtello. In this same direction Cailliaud places Gambél and Dallalte, where there are copper-mines.† In my MS. notes‡ I find it recorded, that to the W. of the Dábana, a principal tributary of the Dedhésa, there is a Galla district called *Gambél*, the chief of which is *Wakontále*,

* In the pamphlet already adverted to, in page 32. note.

† Vol. iii. p. 47.

‡ In my note-book I have a mass of information, collected from various Abessinians and Gallas in Gódjam and elsewhere, which, from its want of connexion, cannot readily be made available. But it may become so from time to time, as in the present instance with respect to the Galla chief Wakontále.

surnamed from his horse, Abba-Loko—"the rider of the Lizard (?)"—who some time since fought with the Arabs and conquered them. This chief is evidently the Werkholtello (according to the German orthography, Wercholtello) of Russeger; the position of whose residence, *Lerha in Gambél*, may, from a comparison of the data thus furnished by that traveller, Cailliaud, and myself, be determined with sufficient accuracy. Russeger goes on to say, that after three days' journey further S. from Lerha, over a level country, a large river occurs, which is called by the Arab slave-dealers who travel thither *Baḥr el Abyad*, or the White River. The sources of this river are said to be in the high land of the Gallas, and its course from E. to W. as far as the country of the Dinkas, where it turns northwards and descends to Khartúm.*

Knowing as we do, that, to the S. of the junction of the Sobát with the direct stream of the Baḥr el Abyad, the latter river was ascended by the Egyptian expeditions to beyond the 5th parallel of N. lat., and that in no portion of their route above that junction did they pass to the east of the 32nd meridian E. of Greenwich, it is a mere truism to say that we shall not find the *Baḥr el Abyad* anywhere to the N. or E. of those limits: consequently, the river in 8° N. lat., and between 34° and 35° E. long., designated "Baḥr el Abyad" by M. Russeger's informants, can by no possibility be the river of that name which was ascended by MM. d'Arnaud and Werne.

Still, Russeger's information is too precise and too positive to be rejected, especially as the position of the residence of the Galla chief Wakontále, the last stage on the road to the river called Baḥr el Abyad, is, as it has been seen, determined from a totally independent source: in addition to which, my memoir of the 23rd November, 1843,† contains positive evidence of the existence, in the direction thus attributed to the "Baḥr el Abyad," of the *Báro*,—"a very large river," "much larger than the Abáï,"—to which the Gallas of Gúderu are in the habit of proceeding in their military and elephant-hunting expeditions, "the distance gone by them being 14, others said 16 or 17 days on horseback." Now, 300 miles (15 days at 20 miles *per diem*) in a direction nearly W. from Gúderu, brings us to the "plaine couverte de hautes graminées et où paissent de nombreux troupeaux d'éléphants" of d'Arnaud's map, through which the *Sobát* has its course. Hence there can be no difficulty in identifying the *Báro* with the Sobát, Téli, T'á, Baḥr el Makádah, or

* See, to the same effect, Russeger's 'Reise, &c.,' vol. ii. part ii. p. 88. In the extract from M. Russeger's pamphlet, the distance from Lerha to the "Baḥr el Abyad" is stated to be only three days' journey: in his 'Travels' it is five.

† 'Journal R. G. S.,' vol. xiii. p. 268.

River of Hábesb, of the Egyptian expeditions, and with the "Bahṛ el Abyád" of Russegger. A letter from M. d'Abbadie, dated A'dowa, the 14th of October, 1844, is precisely to the same effect: "*Le Saubat de M. d'Arnaud, est évidemment mon Baro, et ses Barry sont mes Souro, pasteurs qui confinent à Kafa.*"* In this latter particular, however, that traveller is in error. The country of the Behrs or Barry does not confine on Káffa, but is 300 miles distant from Bóna, the capital of that kingdom; while, according to my informant 'Omar ibn Nedját, the country of Súro is only two days' journey to the W. of Bóna.† It is to be remarked, in further confirmation of the identity of the Báro with the Sobát or Téli, that in the same way as, according to the information obtained by me, the valley of the Báro is "inhabited by Shánkallas or negroes, but beyond them to the W. are other tribes of Gallas speaking a different language, or at least a different dialect;"‡ so, in M. d'Arnaud's map, the "Pays des Dinka," the well-known negro race dwelling between the Blue and White Rivers, is shown as extending southwards as far as the Sobát, while beyond that river to the W. begins the country of the Nuwérs (Nouerres), a people (according to M. Thibaut, who likewise accompanied the expedition) "whose complexion inclines towards red, and whose hair is not woolly;"§ that is to say, a race distinct from their negro neighbours, and apparently of cognate origin with the inhabitants of the Abessinian plateau.¶ It is true that in M. d'Arnaud's table of the several tribes inhabiting the valley of the Bahṛ el Abyád, the Nuwérs are classed with "the Dinkas and the several other tribes speaking nearly the same language;"¶ and M. Werne says, in like manner, that "the language of the Dinkas who inhabit the right bank of the Bahṛ el Abyád, as far as the Sobát, extends, with certain modifications, as far up the former river as the country of the Chírs (Tshier)."*** But one of these "modifications" may possibly be, that the Nuwérs, whose origin, as a red race, is manifestly different from that of the Dinka negroes, have a language of their own distinct from that of their neighbours, though they may be familiar with the latter also, and may use it in their communications with strangers.

Though the Báro is thus shown to be a continuation of the

* 'Nouvelles Annales des Voyages,' 1845, vol. i. p. 263.

† 'Journal R. G. S.,' vol. xiii. p. 268.

‡ Ibid.

§ "Par 8° latitude N. . . . commence le pays des Nouers . . . la couleur de leur peau tire sur le rouge; les cheveux ne sont pas crépus."—'Bulletin,' 2nd Series, vol. xviii. p. 352.

¶ It would be important to ascertain whether the language of these red people, the Nuwérs, is cognate with that of the Gallas, or with that of the Góngas, the earlier inhabitants of the whole of the table-land from beyond Káffa to the Abáí. If the statement of my Gáderu informants is to be taken literally, the Nuwérs are a tribe of Gallas.

¶ 'Bulletin,' 2nd Series, vol. xix. pp. 91, 93.

*** 'Blick in das Nil-Quellland,' p. 48.

Sobát or Télfí of M. d'Arnaud, it does not necessarily follow that it is *alone* the upper course of that river. By persons reaching its right bank from the N., like M. Russegger's Arab slave-dealers of Sennár and my Galla merchants and elephant-hunters of Gúderu, it would be regarded as the upper portion of the main stream, just as the Sobát of M. Castelli is considered as such by the Dinkas; since, in each case, their information does not extend beyond it. But, by persons acquainted with the countries and rivers lying further to the S. and E., the Báro is known to be a tributary of the Gódjeb; and as it will be shown that it is this latter river which is really the upper course or main stream of the Sobát or Télfí, it will follow that the Báro, like the Sobát of the Dinkas, is only a branch of the principal stream on its right bank, whatever may be the correct name of that principal stream.

Of all the rivers of Eastern Africa, except the Nile itself, the *Gódjeb* is that which during the last few years has attracted the most attention. Before entering upon its particular consideration, it may, therefore, be not uninteresting to repeat briefly the steps by which a knowledge of this river has been acquired. As early as May, 1841, I sent home from Shoa certain particulars respecting the Gódjeb, which had been obtained by Dr. Krapf and myself from a slave of the king, named Dilbo. He described it as being about 3 miles across, and as flowing between Enárea and Káffa "to the country of the Arabs;"* by which expression he was understood by Dr. Krapf and myself to mean, that it reached the shores of the Indian Ocean frequented by the Arabs. I was till recently under the impression that this was the first occasion on which even *the name* of this river had been communicated to the civilized world; but on looking through the volumes of the 'Bulletin' of the Geographical Society of Paris, I find that as early as the 16th of August, 1839, M. Antoine d'Abbadie, in a memoir read before that Society, mentions his having been informed by a merchant of Dérita named Wárkie, whom he had met with at Masówah on his first visit to Abessinia, that "la rivière *Goudjoub* coule par Kaffa et Oenāryā dans l'Abbāy,"† but without stating any other particulars respecting it or directing any special notice to it.

In a very copious memoir communicated by Dr. Krapf to the Egyptian Society of Cairo in August, 1842, and published (in a translation) in the 'Monatsberichte' of the Geographical Society of Berlin,‡ many additional details obtained by him from Dilbo are given respecting the Gódjeb—called by him "Goshop," or "Gochob,"—and the neighbouring countries; and the same par-

* See 'Journal R. G. S.,' vol. xii. p. 57; and 'A Statement of Facts, &c.,' p. 7.

† 'Bulletin,' 2nd Series, vol. xii. p. 189. ‡ Part iv. (1842-3), p. 172, sqq.

ticulars, with little modification, are likewise inserted by Sir William C. Harris, in his 'Highlands of Æthiopia;' * the river, which is called by him "*Gochob*," after Dr. Krapf's German pronunciation, being, in accordance with the views regarding Dilbo's statement originally entertained by Dr. Krapf and myself, made to flow into the Indian Ocean.

On my arrival in Gódjam, I soon discovered, that, if Dilbo really knew the true course of the Gódjeb (which I much doubt), his "country of the Arabs" must mean, not the shores of the Indian Ocean, but Sennár; for, from information obtained from many persons, both Abessinians and Gallas, it was made certain that it joins the "Abáí." This expression I have since found to be just as indefinite as the "Nile" and the "Bahr el Abyad" of the Arabs of Sennár, but I was not then aware of that circumstance; and having at the same time positively ascertained the existence of the western branch of the Blue River, and being misled by Mr. McQueen's statement in his 'Geographical Survey of Africa'† as to the time of the latter river's flooding in Sennár, I was induced to regard the Gódjeb as the upper course of this western branch, and so I laid it down in my map of the 6th September, 1842, of which mention has already been made.‡ Further information, however, soon convinced me that this, although an advance towards the truth, was not the truth itself; for, instead of the Gódjeb, with its tributaries the Gibbe, Báro, and Gaba, flowing, together with the Dedhésa, to the Abáí, the Dedhésa alone was found really to do so: and, accordingly, my map of the 23rd of November, 1843,§ showed this latter river to be the direct course from S. to N. of the Blue River.

The Gódjeb, on the other hand, in a most important map || drawn under the dictation of 'Omar ibn Nedját, a Mohammedan merchant of Déríta, was made to form a curve round Kaffa and the adjacent countries, and to join "the Abáí of Sennár."¶ That such is really the case is expressly asserted, not only by M. d'Abbadie (as we shall next proceed to show), but likewise by

* Vol. iii. *passim*.

† P. 236. See the note in page 26 of the present Essay.

‡ See page 27.

§ See page 26.

|| The value of this map is such, that it is to be regretted it was not published in the Society's 'Journal' at the same time as the memoir in which it is mentioned. It is, however, given herewith.

¶ 'Journal R. G. S.,' vol. xiii. p. 267. In my note-book I find the following note written at Wogádj near Yejábbi, on the 20th January, 1843:—"Hádji Mohammed Núr, a merchant trading to Knárea, informs me that the Gódjeb rises on this side (i. e. to the north) of Káffa, and runs southwards; then turning round far off to the west, it comes round again northwards, and joins the Abáí or Bahr el Azrek at Khartúm, being in fact the Bahr el Abyad. He drew its course on the ground with his stick, as also that of the Bahr el Azrek, and spoke quite positively on the subject. He seems a very intelligent man, and has been to Egypt, Bombay, &c." I had quite overlooked this note until within the last few days.—13th February, 1847.

M. Lefebvre, who states* on the authority of a merchant of Kaffa, named Irbo, that the Gódjeb is a mile in width when it arrives in the plain country of the Shánkalas or negroes *before falling into the White River*. And the same is further virtually confirmed by M. d'Arnaud's map of the Bahr el Abyad, contained in the 'Bulletin' of the Geographical Society of Paris for February, 1843,† in which the united stream of the Gódjeb and Shoabérri (Choa-Berry) is laid down as the continuation of the main stream of the Bahr el Abyad from the extreme point reached by the Egyptian expeditions. M. d'Arnaud's authority for this I infer to be M. Blondeel van Cuelebroek, the Belgian Consul-General in Egypt, and Mr. Bell, who were in Gódjam in 1842 and left that province just as I entered it; since he states‡ that he received some information from those gentlemen respecting the Sidámas, that is to say, the people of Káffa, in whose country the Gódjeb rises. The mistake in this map is making the river to run south-westwards instead of north-westwards to join the Bahr el Abyad.

When my memoir of the 23rd of November, 1843, was communicated to the Royal Geographical Society, Sir William Harris and Mr. McQueen were strongly advocating the course of the Gódjeb—by them called "*Gochob*"—to the Indian Ocean, and its identity with the Jubb or Gowin; § and I was assured, on what I considered to be unquestionable authority, that it was a positive fact that *the Jubb or "Gochob" had been navigated by Europeans upwards from the sea to near Enárea*. Under these circumstances, though I had every reason to credit the accuracy of 'Omar's statements, I could not fly in the face of what was so confidently asserted to be a fact; and therefore I had no alternative but to let the question remain till it should be capable of determination on further evidence.|| The appearance of that evidence was not long delayed. In February, 1844, the Jubb or Gowin was ascended by Mr. Henry C. Arc Angelo, who has published a brief account of his expedition in the 'United Service Journal' for January and February, 1845. He says:—"The river Juba is not known to the natives by the name Major Harris has given

* 'Bulletin,' 3rd Series, vol. i. p. 54.

† Second Series, vol. xix. ‡ 'Bulletin,' vol. xviii. p. 379; vol. xix. p. 445.

§ As late as May 3rd, 1844 (see 'Blackwood's Magazine' for June, 1844, vol. lv. p. 735), Mr. McQueen affirmed that the "*Gochob* . . . is called Jub by the Arabians, Gowend or Goveud by the Somaui, Yumbu by the Souahilis, and Danesa by the Gallas"—"the Dedhasa (pronounced Nassal) being considered to be the same as Danesa or Danesa." (ibid., p. 734.) By this, it may be presumed, is meant not that "*Nassal*" is another name of the river, but that "*Dedhása*," if pronounced *nassally*, becomes "*Danesa*." However this may be, we must question the correctness of Mr. McQueen's map of the 15th March, 1844, published at the same time, in which three distinct and separate streams—the Dedhása, the upper course of the Blue River; the "*Góchob*" (i. e. Gódjeb), a tributary of the White River; and the Jubb or Gowin [i. e. the Wábbi-Giwéyna], which discharges itself into the Indian Ocean—are all laid down as parts of one and the same stream.

|| See on this subject 'Nouvelles Annales des Voyages,' 1846, vol. iii. p. 225, sqq.

it, viz., 'Gochob';* it is called by them Gowín or Jub, and sometimes Gunarlee,† as they say it is the principal branch of the Gunarlee. *It may be set down as an incontrovertible fact, that no Europeans have been up the river 'Gochob' or Juba, for the purpose that Major Harris mentions, viz., traffic in slaves; or indeed for any other purposes, with the exception of myself, up to February, 1844.*‡ Mr. Arc Angelo ascended the river about 220 or 240 miles, on a general bearing (as well as can be collected from his narrative, which is not so ample or definite as could have been desired) of about N.N.W.,§ so that the furthest point reached by him does not go beyond about 3° 20' N. lat. and 41° 20' E. long. At this point the traveller thus describes the river:—"The current after this became stronger every mile; there was, however, plenty of water, the river rather narrow. . . . Sometimes in the day the current would be so strong that it was impossible to get 300 yards in four hours. I imagine a very small steamer would do. Some considerable distance up there are several falls, one of which was said to be a very high one."|| So far therefore from the Gowín or Jubb having been ascended *as far as Enárea*, we find that its first explorer, Mr. Arc Angelo, when at his furthest point, was still nearly 400 miles distant from that country;¶ that the river was there scarcely navigable on account of the rapidity of the current; and that it soon ceased to be so altogether. And there can be little doubt that, like the Hawásh and the Wábbi (if it be not the Wábbi itself), the Gowín or Jubb has its rise on the *easternmost* limit of the mountain-chain of Eastern Africa, which, as its declivity on that side is much shorter and more rapid than towards the N. and W., cannot give rise to streams of such magnitude as those which have their origin and course on its western flank.**

This digression concerning the Gowín [Wábbi-Giwéyna] or

* As opposed to this, it is stated by a London correspondent of M. Jomard, in a letter dated 16th November, 1844:—"I have in my hands a letter from a person . . . who has ascended the river Jub in a large canoe as far as 240 miles according to his reckoning: he says that *this river is the same as that which is called Gochob by Major Harris.*"—'Bulletin,' 3rd Series, vol. iii. p. 67.

† i.e. Ganáli, the Ganana of M. d'Abbadie in the 'Esquisse du pays de Sçoumál,' in vol. xvii. of 'Bulletin de la Société de Géographie.'—F. S.

‡ P. 128.

§ This is about the direction attributed to it, from native information, in Lieutenant Christopher's map in vol. 14, part i. of the Society's 'Journal.'

|| P. 283.

¶ According to M. d'Abbadie ('Bulletin,' 3rd Series, vol. iv. p. 231), Sákka, the capital of Enárea, is in 8° 12' 30" N. lat. and 34° 18' 36" long. E. of Paris, or 36° 38' 58" E. of Greenwich.

** Further researches have completely confirmed the opinion here expressed. *Wábbi* is not a proper name, but an appellative signifying "river." M. d'Avezac, in his 'Essai sur la géographie du pays de Sçoumál,' printed in vol. xvii. of the 'Bulletin de la Société de Géographie' (p. 109), justly surmised that such must be the case, inasmuch as the information respecting the various rivers called by that name collected by M. An-

Jubb was necessary, in order to remove from the consideration of the Gódjeb one of its main difficulties, namely, the opinion—first advanced (but soon recalled) by myself, and since so positively and repeatedly asserted by others—that it flows into the Indian Ocean.

We may now return to the investigation of the course of the Gódjeb as described by 'Omar ibn Nedját. In the first place it must be observed, that that intelligent native does not assert this river to be "the Abá of Sennár" itself—that is to say, the Bahr el Abyad, or main stream of the Nile,—but says that it *joins* that river beyond Siéka, a country lying a week's journey to the west of Bónga, the capital of Kaffa.* Now, if the course of the Gódjeb be carried round Káffa to the E., S., and W.; be then made to turn to the N.W. at about 80 or 100 miles—"a week's journey"—to the W. of Bónga (which city is placed by M. d'Abbadie in 7° 12' 30" N. lat. and 36° 4' long. E. of Greenwich); and be thence continued in the same direction, which is that of all the principal tributaries of the Nile which descend from the Abessinian table-land; we shall find that it, not less than the Báro (M. Russegger's "Bahr el Abyad"), exactly coincides with the Sobát of M. d'Arnaud's map. And if, as has been stated and as will be more fully shown in the sequel, the Báro is a tributary of the Gódjeb, it will result that the latter river, and not the former, is the upper course of the Sobát or Télfí of the Egyptian expeditions.

Within the last two years letters have been received from M. Antoine d'Abbadie, communicating the important intelligence of his having penetrated S. of Góddjam as far as Enárea and Káffa. Hitherto the only particulars of his journey imparted to the public, are contained in a few letters published in the 'Athenæum,'† the 'Bulletin' of the Geographical Society of Paris,‡ the 'Nouvelles Annales des Voyages,'§ and probably some other periodical pub-

toine d'Abbadie, on which information that Essay is based, could not well be applicable to a single stream. Hence, M. d'Abbadie's "Wébigi-weyna, c'est-à-dire le grand Wébi" (*ibid.*, p. 98), which name has to be read "Wábbi-Giwéyna," is simply *the river Gowín, or Jubb, ascended* by Mr. Arcangelo. M. Rochet d'Héricourt, in his 'Second Voyage au Royaume de Choa,' p. 274, mentions his having been informed that *the river (Wábbi) which falls into the Indian Ocean at Juba*—consequently the Wábbi-Giwéyna or Gowín—the pseudo-Gódjeb or "Gochob"—has its source in the Galla country of Korchássi, situate to the south of Lake Zuwái, that is to say near the edge of the table-land; and that it passes through a large lake there. He was further informed of the river (Wábbi) of Hárrar; and being misled by the term "Wábbi," and supposing the two rivers to be but one, he in his map makes the former to go round to the north-east, before descending to the ocean, as if it were the head of the latter. But if the Wábbi of Hárrar really joins the Wábbi-Giwéyna, it must be a separate branch of that river quite distinct from the branch which has its rise in Korchássi. It may, however, be a different river altogether, namely, the river Haines, of Lieut. Christopher ('Journal R. G. S.', vol. xiv. p. 96).—12th March, 1847.

* 'Journal R. G. S.', vol. xiii. p. 264. *sqq.* † No. 906, of March 8, 1845, p. 243.

‡ Third Series, vol. iii. pp. 52, *sqq.*, 311, *sqq.*

§ For 1845, vol. i. pp. 260, *sqq.*, 365, *sqq.*; vol. ii. p. 107, *sqq.*

lications. This journey has a claim to be regarded as one of the most important ever accomplished in Africa. It is therefore with the deepest interest that we look for full details respecting it, together with the map of the enterprising traveller's route, the sketch of which had been unfortunately left behind at Gondar, when he wrote from Masówah at the close of 1844, announcing his return from those countries so imperfectly known.

M. d'Abbadie states that he crossed the Gódjeb within 30 miles of its source,* and he entirely confirms 'Omar's statement as to the spiral course which that river takes round Káffa to join the Nile.† But M. d'Abbadie goes further, and gives it as his decided opinion that *the Gódjeb is the Nile itself*. Every opinion on the subject of the geography of Eastern Africa, expressed by one who has travelled for so many years in that quarter of the globe, and who has manifested so much zeal and ability in the investigation of it, is entitled to respect. Still, if the subject be viewed in all its bearings, such an opinion will be found to be untenable. To disprove its correctness formally would only lead to needless repetition, since the arguments which it would be necessary to adduce, are to be found in their proper place in the course of the present investigation. Without pausing, therefore, to examine M. d'Abbadie's hypothesis in detail, but assuming that the identity of the Gódjeb with the Téli or Sobát, is, or at all events will be, sufficiently established in the course of these remarks, we shall proceed to the consideration of the tributaries of that river on its right bank.

The first of these is the small stream already mentioned, under the name of "Sobát," as having been reached and repeatedly crossed by M. Castelli, which has already received all the consideration of which it is susceptible.‡

The other tributaries of the Gódjeb on its right bank, enumerated by M. d'Abbadie in the order in which they join that river from below, are the Báro, the Birbir, the Kotáda in the country of Yámbo; the Oshko (Ochko) or Baço (Baqo), a noble stream which runs through Siéka (Seka), the country of the Mashango (Machango) negroes; the Kesho (Kecho) in Súro; the Abáwa, Gúma, Hirgimo, Shácho (Chatcho), Bándja and Góra in Góbo,

* This source is placed by M. d'Abbadie ('Nouvelles Annales des Voyages,' 1845, vol. ii. p. 112) in about 7° 20' N. lat., and 1° 20' long. (estimated) W. of Sákka; consequently about 35° 20' E. of Greenwich. Its site is determined by the position, *inter alia*, of the bridge at Kángkati (Kankatti), two days' journey, or 30 miles, from its source, over which bridge that traveller crossed the river on his way from Sákka to Bóna. But, viewing the positions of those two towns, on the *direct* road between which I have always understood Kángkati to be, this latter place ought to be at least *sixty* miles from the source of the Gódjeb.

† See to the same effect the statement of Hádji Mòhammed Núr, in page 44, *note*.

‡ See page 39, *sq.*

and the Bitino in Kullo.* In another list furnished by the same traveller,† the Birbir is placed below the Báro, in which case it might possibly be identical with the Sobát of M. Castelli.

Respecting the Báro, M. d'Abbadie remarks:‡—"This river deserves special attention, since even in Wallégga it is already as large as the Abá'i at the ford of A'muru,§ and the timid Ethiopians dare not cross it without sacrificing to the god of the river. . . . On credible testimony it is almost as large as the Gódjeb itself, where it joins the latter in the country of Yámbo." This information is entirely corroborative of that collected by myself respecting the Báro.¶ In one passage, in which the same traveller mentions the several names under which the Gódjeb passes before it merges in the Bahr el Abyad, he states that it is called Báro in the lower part of its course;|| which must be understood as meaning below the confluence of the two streams. This is quite in accordance with the relation of the elephant-hunters of Gúderu, to which allusion has already been made.** And it is likewise another instance of the facility with which mistakes may arise in information respecting rivers obtained from natives. The Sidámas of Káffa call the common stream by the name of Gódjeb; but the Gallas of Gúderu know it—and probably also the Nile itself below the junction††—as the *Báro*; while among the Dínkas, whose horizon would appear to be bounded by the Sobát, the name of this petty stream usurps the place of that of the common bed of those two noble rivers!

Confining ourselves for the present to the consideration of the Báro, we find the following rivers mentioned by M. d'Abbadie as joining it on its right bank, viz., the Botor, Sor, Wichi, Gúmaro, Kónhor (Konnor), Yúbbi, Búrie (Boure), and Gába (Gábba).‡‡ Of these, the names of Búrie, Kónhor, Gúmaro, Sor, and Bótor are known to me, from my Galla itineraries, as those of *places* (which may derive their names from streams flowing by them, or *vice versá*) lying to the north of the Báro; but the Gába alone was described to me as a river. On it there is a large market of the same name, and it runs at a short distance beyond Kúra, the residence of a principal chief of Wallégga, named Chalishóno. It has its head in the large forest in which the Gódjeb rises.

According to M. d'Abbadie, "the Báro, which the Sidámas

* 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 114.

† Ibid., vol. i. p. 365.

‡ Ibid., vol. ii. p. 114.

§ i. e. Mélka-A'bro, the ford in Shínasha on the road between Búrie and A'muru.

¶ See page 41, sq.

|| 'Nouvelles Annales des Voyages,' vol. i. p. 365.

** Page 41.

†† Under this view of the case, the tradition of the Gallas that they came from Bar-gámo—i. e. from *beyond the Báro*—(see 'Journal R. G. S.,' vol. xiii. p. 269), might resolve itself into the fact that their original seat was *beyond the Nile*.

‡‡ 'Nouvelles Annales des Voyages,' vol. ii. p. 114.

call Bóta, has its source near to that of the Gódjeb,"* that is to say, "in the country of Gímira, Gámáro or Gámru, on the same plateau, and at a distance of about 3 days' journey (50 miles)."+ On its left bank, according to the same traveller, its tributaries are the Gándji, "which has its source close to the spring from which the Gódjeb itself rises," the Siria and the Bonga. "This list," he adds, "would be much larger, were we to add the sub-tributaries of the Báro."

Of the other tributaries of the Gódjeb on its right bank named by M. d'Abbadie, no details are given by him except of the Oshko or Báko (Baço, also written Bago and Bako). The source of this river is stated to be in the centre of the great curve of the Gódjeb, at a day's journey from Bónga; and, in addition to the names above-mentioned, it is called Wosh (Woch) by the people of Gímira, and Wása by the Sidámas.† This diversity of name in the various countries through which it passes, proves the Báko to be a stream of considerable magnitude. In my native itineraries, I find mention made of the "Bákko," as being a large river beyond the Báro, as far as which the Galla country known under the comprehensive title of Wallégga extends; its valley, like that of the Báro itself, being an important hunting-ground for elephants and buffaloes. Besides calling the Báko a tributary of the Gódjeb, M. d'Abbadie states that it is the name by which the principal stream itself is known to the people of Wallégga,§ that is to say, the Gallas dwelling on its right bank. Here we have again another instance of the main stream's passing under the name of its tributary.

The close parallelism between the Bahr el Azrek, with its spiral head and its two principal tributaries on the right bank, the Dender and Ra'ad, running side by side in the same direction with it, and the Télfí or Gódjeb having the same form with similar tributaries, the Báko and Báro, is most striking; and it is a convincing proof that thus far S. the general characters of the mountain-chain of Eastern Africa remain unaltered: so that, seeing that towards the N. the Tákkazie partakes more or less of the same characters, we may be prepared to find some not dissimilar ones reproduced in the *Shoabérri* yet further to the south.

In order to complete the list of the tributaries of the Gódjeb on its right bank, it must be remarked, that, on a previous occasion, M. d'Abbadie makes mention of the Götsi|| "as a river flowing past Bónga, the capital of Káffa," which is described by him as "a very large stream, comparable with the Gódjeb, which it joins;"

* 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 114.

† Ibid., p. 112.

‡ Ibid., p. 115.

§ Ibid., p. 115.

|| 'Bulletin,' 2nd Series, vol. xix. p. 439.

but this name does not appear in that traveller's later lists drawn up after his return from Bóna. It may, however, be only another form of the name Gódjeb: 'Omar called the lower course of this river Gódje. And from a young man named Dódjamo, a native of Worátta, who was a long time a slave in Djímma-Káka and Enárea, and came afterwards to Yáush, where I knew him as a Christian by the name of Wálda Mikael, I obtained the names and approximate courses of two rivers flowing through his native country, called Zígena and Wáto, which were stated by him to join the Gódjeb on its right bank. These rivers are shown in my map of the 23rd of November, 1843, and are probably identical with some of those enumerated by M. d'Abbadie.

The Gódjeb was described to me as rising in an immense forest extending between Wallégga, Gúma, Géra, and Káffa, through which the caravans going to the last-named country must pass. This forest is impervious to the rays of the sun, which is not visible to travellers for four or five successive days. In it and in its immediate vicinity are found the heads of the Báro, Gába, Gíbbe, and Dedhésa, as well as that of the Gódjeb; and at that part of the course of this latter river, where it is crossed on one of the caravan-routes between Gúma and Káffa, it is but a small brook.* The head of the Gódjeb is placed by M. d'Abbadie in about 7° 20' N. lat., and 1° 20' long. W. of Sákka; within 10 miles of latitude and 5 miles of longitude of the spot where it is laid down in my map of the 23rd of November, 1843. It was described to M. d'Abbadie as being at a place called Gandjès, between two high hills (hautes collines) called Boshi and Doshi (Bochi and Dochi), in the country of Gimiru, Gámáro, or Gámru.†

With reference to this latter point, that traveller remarks: † "Now, it is an historical fact, that, prior to the sixteenth century, the Arabs were in constant communication with Hárarge and Dáwaro. It was probably from this quarter that they obtained their information respecting the source of the White River; and seeing the two mountains of Gandjès, they may have called them the mountains of the Gámru (Djabal el Qamr). But the Arabic word *gamr*, or *qamr* [Kámar], signifies 'moon,' and hence has arisen the curious error of 'the Mountains of the Moon.'" We will not stop here to discuss the position of Gimira, which country is placed by 'Omar ibn Nedjât to the S. of Káffa; whereas, according to M. d'Abbadie, it must be towards the N., in order that the source of the Gódjeb should be found within it. But we object altogether to his *derivation* of the name "Mountains of the Moon." If, as he states, the first mention of these mountains had been made by the

* 'Journal R. G. S.,' vol. xlii. p. 255.

† 'Nouvelles Annales des Voyages,' vol. ii. p. 112.

† Ibid., p. 113.

Arabs, who obtained their knowledge of them prior to the *sixteenth* century from native sources, it will not be denied that they might have made the expression *the mountains of Gímira*, or *Gámru*, significant in their own language as *Djebel el Kámar* (جبل القمر).

But the fact is that the "Mountains of the Moon" were already known to Ptolemy in the commencement of the *second* century by the name of τὸ τῆς Σελήνης ὄρος.* If, then, as M. d'Abbadie contends, the expression "the mountains of Gímira" was first made significant by *the Arabs*, it would follow that the geographer of Alexandria derived his *Greek* name through the Arabic language, and his knowledge of the upper course of the Nile from the Arabs themselves. The correctness of this hypothesis will, of course, not be insisted on. If, on the other hand, it be admitted—and it is all but universally admitted—that the Arabian geographers acquired their first geographical notions respecting the interior of Africa from Ptolemy, including that of the upper course of the Nile and its origin in the "Mountains of the Moon," we can perfectly understand how the Greek name τὸ τῆς ΣΕΛΗΝΗΣ ὄρος should have been translated by them جبل القمر *Djebel el Ká'MAR*, in the same way as it is rendered "Mountains of the Moon" in all European languages.

It is true that the Arabian writers have attached a different meaning to the word قمر, by reading it *Komr* as if pointed with a *damma*, instead of *Kámar* with a *fathá*; and they have given certain fanciful reasons for the name *Komr*, which are cited by De Sacy in his version of 'Abdu'-l Latîf's 'Description of Egypt.'† But, in the derivation of the names of places, it

* Lib. iv. cap. ix. p. 115 (edit. Bertii, p. 131).

† "On traduit ordinairement le nom de ces montagnes par *les monts de la Lune*, et j'ai suivi cet usage. Je ne sais si les Arabes ont pris originairement cette dénomination de Ptolémée, qui place les sources du Nil bien au-delà de l'équateur, dans les hautes montagnes de la Lune, *σελήνης ὄρος*. On peut croire qu'ils entendent effectivement aujourd'hui le mot قمر, nom qu'ils donnent à cette montagne, dans le sens de *la lune*, en le prononçant *Kamar*, puisque Léon Africain* dit du Nil: *Alcuni vogliono ch'ei nasca dai monti della Luna*. Je ne crois pas cependant que ç'ait été l'opinion des an-

ciens écrivains Arabes, qui prononcent ce mot قمر *Komr*. Maķirzi,^b qui détermine positivement cette prononciation, ainsi que l'auteur du *Kamous*, dit que dans la mer de Zanguebar il y a une grande île dont la longueur est de quatre mois de marche sur une largeur de vingt journées, et qui fait face à l'île de Ceylan; que parmi les diverses contrées que renferme cette île, il y en a une nommée *Komriyya* قمرية, d'où l'oiseau nommé *Komri* قمرى prend son nom. Il ajoute que cette île se trouvant trop petite

* Descr. dell' Africa, dans la collection de Ramusio, t. i. fol. 98, B.

^b Mau. Ar. de la Bibl. imp. n° 682, fol. 20, recto.

is a rule of sound etymology to consider, that, whenever a story is attached to a name for the purpose of accounting for its origin, the story, instead of having given rise to the name, has, on the contrary, sprung out of it through ignorance of its real import.* The simplest and most natural derivation of a name will generally be found to be the correct one, and we should doubtless be erring were we to look elsewhere than to the Greek of Ptolemy for a derivation of the Arabic name. The tales of the Arabian writers may be regarded merely as attempts to *explain* a word, of the origin and real meaning of which they had lost the knowledge.

The Greek derivation of the name being then admitted, we have this alternative as to its origin: either there is some country of which the native name bears a resemblance to the Greek word *Selene*, or else the "Mountains of the Moon" derive their title from some country of which the native name is in itself significant.†

That a country, whose native name is thus significant, does actually exist, and that the Nile has its rise in that country, will be shown in the sequel. For the present we must confine ourselves to the consideration of the Gódjeb and its tributaries.

Proceeding next down the left bank of that river, M. d'Abbadie

pour son immense population, plusieurs de ses habitants passèrent sur le continent, et qu'ils y formèrent divers établissemens sur les côtes au pied de la montagne qui prit

d'eux le nom qu'elle porte de montagne de *Komr*, جبل القمر. Aboulféda^c rejette positivement l'opinion de ceux qui prononcent *Kamar*, et qui dérivent ce nom de celui

de la lune. Comme le mot *Komr* est le pluriel de *قمر*, qui signifie un objet d'une couleur verdâtre, ou d'un blanc sale, suivant l'auteur du *Kamou*, il paraît que quelques écrivains ont cru que cette montagne tirait son nom de sa couleur. D'autres semblent avoir voulu réunir ces deux étymologies, en attribuant à cette montagne des couleurs qu'elle doit, suivant eux, aux diverses phases de la lune."—"Relation de l'Égypte, par Abd-Allatif" (4to. Paris, 1810), p. 7, *seq.*

* There would be no difficulty in citing numerous examples of this, but a single one may be given, as being perfectly analogous to the present case. Mr. W. J. Hamilton, in his 'Researches in Asia Minor,' vol. ii. p. 103, *sq.*, informs us that the name *Bálkiz*, attached to certain ruins, is supposed by the natives to be composed of the words *Bál*, "honey," and *Kiz*, "girl," and a tale is told, in consequence, about a beautiful girl, the daughter of a king, who was the loveliest of her time, and as sweet as honey. But, as Mr. Hamilton justly remarks, the word is nothing more than *bala* = *παλαιά*, "old," and *kiz* corrupted from *Kúkus*—that is to say "Ancient Cyzicus!"

[*Bálkiz*, "honey-girl," cannot be confounded with *Balkis*, the queen of Sabá; though both are sounded nearly alike in Turkish, as the final *z* has the sound of *s*.—F. S.]

† In this latter case it might even be that the Arabs, from having communication with the inhabitants of that country, were led to translate the name directly, and not through the intervention of the Greek.

^c Büsching's Magazin für die neue Hist. und Geog., t. iv. p. 175.

^d Ibid.

^e Not. et Extr. des Man., t. ii. p. 155.

enumerates* the Náso in Géra; the Búru in Djímma; the Kúsaro, called Gíbbe by the Gallas, which separates Gáro from Djímma-Káka; a second Gíbbe, which, rising in Sibu, skirts the eastern frontier of Yámma or Yángaro (Yangara), and joins the Borara; the Walga and the Borara, which collect the waters of Gurágie; and others, the mention of which must be postponed till we have discussed the subject of the several rivers each of which bears the name of Gíbbe.

As it is justly remarked by M. d'Abbadie,† “the basins of the Blue and White Rivers, encroaching as they do on one another, form a very intricate hydrographical system; for the Gíbbe of Léka, rising in 9° N. lat., joins the White River [*i.e.* the Gódjeb] on its left bank in about the 7th parallel, while the Dedhésa, a tributary of the Blue River on its left bank, rises in the eighth parallel. The little kingdom of Enárea sends half of its waters to the Gíbbe and the other half to the Dedhésa.” This is literally in accordance with my map of the 23rd of November, 1843, in which the Gíbbe of Sibu or of Léka‡ and the Dedhésa are laid down precisely as thus described.

The Gíbbe of Léka is further said by M. d'Abbadie to join the Borara, which, with the Wálga,§ collects the waters of Gurágie, and falls into the Gódjeb. This again is substantially in accordance with the statement of 'Omar ibn Nedjât, that “the Gódjeb and Gíbbe, after uniting in Dóko with another river from I'fat, the name of which he does not know, go round westwards;” || I'fat (E'fat) being the name by which Shoa is generally known among the Mohammedan traders, and Gurágie being regarded as a province of the latter kingdom. M. Lefebvre likewise heard of this river under the name of *Gíbbe*, as rising in the mountains of Agábdjai (Abeze-gaye¶), a district adjoining Gurágie; only his informant appears to have confounded it with the Gíbbe of Léka, which is crossed on the caravan-route from Báso to Enárea.**

* ‘Nouvelles Annales des Voyages,’ 1845, vol. ii. p. 114.

† Ibid., vol. i. p. 366.

‡ This Gíbbe has its rise in Sibu, and runs through Léka on its way south.

§ Whether the Walga is a tributary to the Borara, or a separate affluent of the Gódjeb, is not clearly shown.

|| ‘Journal R. G. S.,’ vol. xiii. p. 267.

¶ ‘Bulletin,’ 2nd Series, vol. xiii. p. 373.

** This traveller would seem to have received some not very intelligible information respecting the Gíbbe. In another place (‘Bulletin,’ 3rd Series, vol. i. p. 53, *sq.*) he says that this river, after passing between Kaffa and Djímma, runs through the countries of Nónno, Bitorène [*i.e.* “and Bótor” in Amharic], Amayase [*i.e.* “and Amáya”], Djándjaro, Agábdjaye [*i.e.* “and Agáhdjai”], Adíya, and Markò; and that then it goes to the south, and not westwards to join the Nile. But, from the now well known positions of all those countries (except “Markò”), it is impossible for any river running to the south to have its course through them *after* passing between Kaffa and Djímma. And further, as according to the statement of M. Lefebvre’s informant Irbo, a native of Kaffa (*ibid.*), the Gódjeb, which river flows westwards to the Nile, is joined by another river coming from the east, it is manifest that no river, such as

So far, therefore, as concerns the Gíbbe of Léka and the river of Gurágie, whether the name of the latter be Borara or Gíbbe, all appears to be quite clear. But with respect to the Kúsaro-Gíbbe the case is different. This river is described by M. d'Abbadie as being totally distinct from the united stream of the other rivers of the same name, and as having its *separate* course to the Gódjeb between Gáro—which country, according to that traveller, is identical with the Bósham or Bósha of the Portuguese—and Djímma-Káka: in other words, it is made by him to run *from N. to S.* on the W. of Yángaro or Djándjaro, and to join the Gódjeb towards the S.W. of that country; while the Gíbbe of Léka and the Borara of Gurágie fall into the latter river on the opposite side of the same country.

That this is really M. d'Abbadie's meaning will be rendered manifest by what he says in a letter to the editor of the '*Athenæum*,'* namely: "According to my informers, the country called Janjáro [Djándjaro] by the Gallas, and Yamma, or Yángara, by its inhabitants from the names of its two principal tribes, is bounded on the E. by the Gíbbe of Léka, which joins the Borara, an affluent of the White Nile [*i. e.* the Gódjeb]; on the west, by a small stream in a desert country east of Bósha, which is thus, like the Yamma, comprised in the fork of the two Gíbbes; *for the second river of this name, identical with the Kúsaro of the Sidámas, joins the Gódjeb on the W. and S.W. of Bósha.*" And in another place he says,† "*the Zébé is my Gíbbe or Kúsaro, an affluent of the Gódjeb or Uma;*" of course alluding to the *Zebeé* of Fernandes. That Father, however, expressly tells us‡ that the *Zebeé* was *twice* crossed by him; the first time to the *west* of Djándjaro (Gingiro) in the position of M. d'Abbadie's Kúsaro-Gíbbe, and the second time to the *east* of that country in the position of the Gíbbe of Léka; thus making what this traveller describes as two separate rivers to be but parts of one continuous stream.

In order to show more distinctly the discordance between the statements of the two travellers, it is necessary here to introduce an analysis of Fernandes's journey from Enárea to Kambwát (Cambate), on which he twice crossed the *Zebeé* as above mentioned. He says, namely,§ that after leaving the court of the

M. Lefebvre's alleged Gíbbe, could run *from north to south* through any of the countries mentioned by him, without having its progress southwards effectually stopped by the one or the other of those two rivers, and its waters carried to the Nile along with those of its recipient. And quite in accordance with this is the statement of my intelligent informant 'Omar ibn Nedjât, as to the fact of the union of the Gíbbe with the Gódjeb and with this other river from the east. See also his Map given herewith.

* No. 906, of March 8th, 1845, p. 243.

† '*Nouvelles Annales des Voyages*,' 1845, vol. i. p. 263.

‡ Tellen, p. 318, sq.

§ *Ibid.*, p. 317, sqq.

king of Enárea (which, as it lay almost due S. of the point where he crossed the Abáí at Miná, must have been far to the W. of Sákká, the present Galla capital), he and his party travelled eastwards one day, when they obtained an escort, and then *four long days'* journey further, always in the same direction, till they came to the eastern confines of Enárea. *A long, steep, and difficult descent into the valley of the Zebéé brought them to that river,* which is described as containing a greater body of water than the Abáí; as being, at the spot where they crossed it, confined between steep rocks; and as running with great violence and noise, most terrific to the travellers. But much more so was the bridge by which they had to cross the river, which was merely a beam of wood, long enough to reach across the stream from the one rock to the other. From the similarity of this passage of the Zebéé to that of the Abáí at the north-eastern extremity of the peninsula of Gódjam, where the two bridges are erected over it,* it is evident that where Fernandes crossed the former river it has just reached the bottom of its great fall, or rather succession of falls, from the general level of the table-land into the deep ravine common to all the principal rivers of Abessinia; since at this portion of its course it would admit of a bridge, such as is described by the traveller, but lower down, where the valley opens, the bed of the river would be much too wide for such a purpose. *Having thus crossed the Zebéé for the first time,* Fernandes and his party entered the small kingdom of Yángaro or Djándjaro—called by the Portuguese Gingiro †—within which country one day's journey brought them to the capital. After a stay of some time there, they proceeded on their journey eastwards, *taking with them people to assist them in again passing the Zebéé* on their way to Kambwát (Cambate).‡ On the first day's journey *they came a second time to that river,* which was here much larger, and had to be crossed by means of a curious raft balanced on an inflated cowhide.

According to this narrative, the Zebéé must necessarily form a curve round the N. of Yángaro, as it is usually shown to do in our maps; and that it really does so is expressly asserted by Tellez on the authority of Fernandes and others,§ and likewise by Abba

* See 'Journal R. G. S.,' vol. xiv. pp. 28, 46, 48.

† As to the various names by which this country is called, see page 19, *note*.

‡ Tellez, p. 319.

§ Porém porque todos esperam algũa noticia d'aquellas regioens, em que se entra de novo, e este Reyno de Gingiró tem algũas cousas muy estranhas, quero as aqui referir, da meneyra que as contou o Padre Antonio Fernandes, varãm de grandissima verdade, com outras pessoas de credito, *que com seus olhos as viram.* O Rio Zebéé de que falamos no capitulo passado, *dá quasi hũa volta a todo este Reyno, deixando o feyto hũa como peninsula* (como se póde ver no nosso mappa,) e d'ali encaminha sua corrente a desgozar pera a parte da costa de Melinde."—p. 320. And again: "He tambem outro rio muyto celebre chamado Zebéé, do qual dizem ser ainda mayor, e mayz caudaloso

Gregorius, the intelligent Abessinian instructor of the learned Job Ludolf.* The latter states that the Zebéé rises in *Enárea*; but this is only a comprehensive designation of the entire country to the S. of the Abáí, as may be proved by numerous instances.† The Jesuit Missionary, on the other hand, describes the position of its source much more definitely. He says that it rises in the country of *Bósha* (Boxa) in the kingdom of *Enárea* (this name being used by him generically in the same way as it is by Gregorius); that it runs a few leagues to the W., then turns northwards, and goes round *Yángaro* (*Gingiro*), of which it makes a sort of peninsula: and that it then turns southwards, and is said by some persons to be the same river as that which enters the ocean at *Mónbasah*.‡

The course of the Zebéé is here described so distinctly, that we can scarcely understand how Fernandes should, by any possibility, have been mistaken. And yet he must have been so, if the fact is that the *Kúsaro* or *Gíbbe* of *Bósha* flows from N. to S. on the western limit of that country and of *Yángaro*, as it is made to do by M. d'Abbadie, when he states that those two countries are "comprised in the fork of the two Gibbes," and that the *Kúsaro-Gíbbe* "joins the *Gódjeb* on the W. and S.W. of *Bósha*." Under these circumstances we are bound to defer to the authority of the Portuguese Missionary in preference to that of the French traveller; since the former states the result of his personal knowledge as an eye-witness, whereas the latter, though he resided several months in *Enárea* and went from that country further S. into *Káffa*, does not appear to have visited *Yángaro* and its river, the *Kúsaro-Gíbbe*.

The native information collected by myself is, besides, much

que o mesmo Nilo [Abáí], nasce em sua terra a quem chamam *Boxa* no Reyno de *Nareá*, que he o mays Austral, do qual faleremos a diante; começa o seu curso pera o Occidente, mas a poucas legoas vira pera o Norte, e vay dando volta ao Reyno de *Gingiró*, fazendo quasi peninsula, como o Nilo faz ao Reyno de *Gojam*; depoy que se retira deste Reyno, toma su corrente pero o Sul, et dizem alguns que este he o que vay sahir em *Mombaga*."—p. 21, sq.

* "De fluminibus, quæ vicinum Oceanum intrans, Gregorius plura non narrat quàm supra retulimus Zebæus in *Enarea* ortus, et finitimum Regnum *Zandjero* insat *Nili*, in modum peninsula ambiens, in meridiem decurrit, et juxta *Mombagam* mari Indico misceri creditur."—"Historia Æthiopica," lib. i. cap. 3.

† See especially Fernandes, in page 24 of the present Essay. M. Rochet d'Héricourt, when at *Túti* (*Touthé*), near the source of the *Hawásh*, thus expresses himself:—"Je m'étais tourné vers une chaîne de montagnes où commence le vaste plateau qui forme des plus riches provinces de l'ancienne Abyssinie, et qui est aujourd'hui occupé par les *Gallas*, le plateau d'*Anoria*; j'en regardais les croupes bleuâtres qui courent de l'occident au midi."—"Second Voyage au Royaume de *Choa*," p. 190, sq. This is evidently not *Enárea* Proper, but only those portions of the *Galla* country to the W. and S.W. of *Shoa*, which are known in *Gódjam* by the names of *Miécha*, *Gandéberat*, *Chélea*, *Wóreb*, &c.—9th March, 1847.

‡ *Monbasah* (*Idrisi*).—F. S.

more in accordance with the statements of Fernandes and Gregorius, than with that of M. d'Abbadie. The general result of this information is, that (independently of the river of Gurágie) there are, in addition to the Gíbbé of Léka, *two* other streams of the same name, both of which run westwards to join the Gíbbé of Léka, as they are in a general way shown to do in my map of the 23rd November, 1843. The one of these rivers is within the modern kingdom of Enárea, and the other in the adjoining kingdom of Djímma-Káka, both of which kingdoms are portions of the country formerly included under the comprehensive name of Enárea. In order to avoid confusion, we shall designate the Enárea of the present day by the name of Enárea Proper.

With respect to the Gíbbé of Djímma, I have a very precise note of a conversation with Dódjamo, the native of Worátta already mentioned,* when he informed me that this river runs between Báddi and Káka in Djímma, *in the high plain country*, just as—only much larger than—the Yéda between Yejúbbi and Yáush,† the cattle of the two districts feeding on its banks. This description is only applicable to the *upper* course of the stream over the level table-land, before it begins to fall into the valley where it was crossed by Fernandes for the first time; and as Djímma-Káka lies to the south of Enárea Proper, this evidence is strongly corroborative of the fact that the Gíbbé of the former country—M. d'Abbadie's Kúsaro—runs from S. to N., and not in the opposite direction.

And as regards the Gíbbé of Enárea Proper, its head was described to me by several persons as being situate in the extensive forest to the W. of that kingdom, in which so many of the principal rivers of this portion of the table-land have their origin. Dódjamo further stated that its course lies between Sákka and Sáfa, formerly the capital of the late king Bófo, surnamed Abba Gómhol, and that *in its valley* are the coffee woods which supply the market of Sákka; these woods lying so close to that town, that the female slaves of the king go from thence to get in the crop, setting off in the morning and returning loaded in the evening.‡

It must be distinctly understood, that, for thus laying down *three* rivers of the name of Gíbbé (exclusively of the Borara of Gurágie, to which M. Lefebvre attributes the like name), we have the authority not merely of 'Omar ibn Nedjât and Dódjamo, but likewise of several other natives, as well as that of M. d'Abbadie

* Page 51.

† This comparison will be better appreciated, when it is explained that our conversation took place at Yáush.

‡ 'Journal R. G. S.,' vol. xiii. p. 257, sq.

himself, who states that "the Göbé (Gíbbe) has *three* sources, *two of which are in Enárea*."*

In my map of the 23rd November, 1843, following that of 'Omar ibn Nedjât too closely—for, from the rough way in which the latter map was drawn,† it makes no pretensions to strict accuracy—the Gíbbe of Enárea Proper and the Gíbbe of Djímma are both laid down as running throughout their respective courses from W. to E.; and they are further made to join the Gíbbe of Léka independently of each other, though close together. But, on a further consideration of the subject, and having especial regard to the narrative of Fernandes as well as to Dódjamo's information, I am induced to regard myself as having been in error in this particular; inasmuch as the river of Djímma-Káka should be laid down as running from S. to N. before taking its course from W. to E., and should be shown as being joined by the Gíbbe of Enárea Proper before uniting with the Gíbbe of Léka.‡ The probable result therefore, after weighing all the evidence, is that the Gíbbe of Enárea Proper rises in the west of that country, and runs eastwards between Sákka and Sáfá to join the Kúsaro or Gíbbe of Djímma. This latter river, however—being the Zebeé of Fernandes—rises in Bósha in the S. of Yángaro, and after a course of a few leagues towards the W., turns northwards, and runs over the level country between Káka and Báddi in Djímma: then, beginning to fall, as is the case with all the principal rivers of the Abessinian plateau, and being joined by the other stream of the same name from the W., it skirts Enárea Proper to the S.E. or E., in a valley commencing with a deep narrow fissure and gradually opening to the extent of several miles, towards the upper end of which valley Fernandes crossed it for the first time on his way eastwards into Yángaro; next, bending its course eastwards, it passes on to the N. of the latter country, where it unites with the Gíbbe of Léka coming from the N.W., and the Borara (Gibbe?) of Gurágie from the N.E. The river, being now vastly increased in size, continues onwards to the S., skirting Yángaro on the E., where it was crossed the second time by the Jesuit Missionary on his road further

* 'Bulletin,' 2nd Series, vol. xix. p. 439.

† See 'Journal R. G. S.,' vol. xiii. p. 256.

‡ According to information furnished to M. d'Abbadie on his first visit to Abessinia, "Enárea is situate at the confluence of two rivers, the Gibe and the Dibi."—"Bulletin," 2nd Series, vol. xii. p. 190. The same traveller says, in a letter dated from Sákka itself, 16th Sept. 1845, "The houses of Sákka are scattered over the right bank of the Walmáí (Oulmay), quite a little stream, which falls into the Gíbbe, the second of that name, which joins the Gíbbe of Sibú. The river thus increased in size skirts Djándjaro, and unites first with the Borara coming from Agábdjai, and afterwards with the Gódjeb, which latter appears to take subsequently the name of Omo—called U'ma by the people of Woráffa."—Ibid., 3rd Series, vol. iii. p. 56.

eastwards into Kambwát or Adíya,* the southernmost province of the ancient Ethiopian Empire.

That, at the place where the Zebeé was crossed the second time by Fernandes, it had already been joined by the Borara of Gurágie, must be inferred, not merely from its greatly increased size, but likewise from the fact that Fernandes makes no mention of his having crossed any other large river on his way further eastwards, which he must otherwise have done, as his road through Kambwát or Adíya took him into the immediate vicinity of Gurágie. This latter country lay, in fact, close upon his left hand as he continued his journey eastwards,† and he particularly mentions an attack made on him and his companions by a party of "five mounted *Gurá-Gués*, and other armed men on foot."‡

Our subject does not require us to say anything further respecting the journey of Fernandes; but it may not be unimportant to remark that, after passing eastwards through Kambwát or Adíya, he came to a district called Alaba,§ governed by a Mohammedan named Alico; beyond which district, he says, he had to go through *Cafraria*: that is to say, the low country, the inhabitants of which, if not absolutely *negroes* (Cafres), are of much darker colour than the fair-complexioned natives of the table-land. Here then the Father had come to the *áffat*, or edge of the table-land, in nearly the 40th meridian of E. long., which meridian he must have struck in about the 8th parallel of N. lat.

Till very recently the course of the united stream of the Gfbbé or Zebeé beyond Yángaro had remained enveloped in doubt and uncertainty. The Portuguese concurred generally in the opinion that it ran to the Indian Ocean, though they were far from agreeing as to the position of its mouth. Some carried it to Mónbasah; others to Melindah; while, on the other hand, Alvarez informs us¶ that it was supposed to run *westwards* to the kingdom of Kongo.** Bruce, when in Abessinia, believed the Gfbbé or Zebeé

* Adíya or Hadéa is the earlier and more correct designation. *Kambwát* (Cambate) is the name of a Galla tribe, which has since formed a settlement in the south of Godjam. See 'Journal R. G. S.,' vol. xiv. p. 25.

† "A mam esquerda ficam aqui huos povos chamados *Gurá-Gués*, os quays povos reconhecem vassalagem ao Emperador."—Tellez, p. 324. ‡ Ibid.

§ Murray, in 'Bruce's Travels,' 2nd Edition, vol. iii. p. 7, mentions *Alamale* (Alaba?) conjointly with Wedge (Wadj, the *Ogo* of the Portuguese), as lying to the north (north-east?) of Cambat and Hadea. Wadj lies to the south of Shoa, and the Emperors of Abessinia resided in that province before they made Gondar their capital.

¶ 'Viaggio nella Ethiopia,' cap. cxxxiii.; in vol. i. p. 249, of Ramusio's 'Navigazioni e Viaggi.'

** "Non si sa particolarmente degli abitanti, dove si finisca di correre; ma si

* The 'Hadiyah' of Abú-l-fedá (p. 160, Rinck, Macrizi, &c., p. 14), the *h* being only a slight aspirate. "It is to the south of Wefát (Isfát of the Abyssinians) or Jiberah." (Ibid.) The adjective of the latter name is Jiberatí, contracted into Jiberti by the modern Egyptians.—F. S.

to be the Bañr el Abyad, which river, however, he understood to be the same as the Yabús of Fázókí—that is to say, the Malég of the Jesuits;* in this latter respect falling into the error of Delisle, which is pointed out by d'Anville.† But after his return to Europe, though he still continued to be mistaken in his identification of the Bañr el Abyad with the Malég, as is substantially shown by his map, he expressly repudiates any connexion between the Zebé and the Bañr el Abyad, and maintains that the former is the same as the “Quilimancy,”‡ in which he merely falls back upon the early error of the Portuguese, as modified by Delisle.§ There can, however, be no longer any doubt as to the fact of its joining the Gódjeb, and through it the Nile.||

Instead of *Gúbbe* Bruce writes *Kibbee*, and he derives this name, on the alleged authority of the Mohammedan merchants of Abessinia, from the Amharic ቅቤ : *Kébis*, “butter.”¶ But this is a mere fancy, like Abessinian derivations generally, of which so many examples are found in the ‘Journals’ of Dr. Krapf.** If the name is significant (as is most likely to be the case), it will assuredly be so, not in the *Amharic* language, which was never

presume che vada verso ponente, nel regno di Manicongo.”—i. e. the kingdom of the King of Kongo. See page 75.

* “The Abiad river is three times as big as the Nile [Bañr el Azrek]. *I always believe it to be the Kibbes of the Nareans or Galla, the Zebé of the Jesuits, the Yabous of the Fazucians*, being the boundary of that province to the westward.”—‘Extract from MS. Notes,’ in Murray’s ‘Life of Bruce,’ p. 418, sq.

† “Le Bañr-el Abiad n’a point été inconnu à M. Delisle, et il est dénommé dans la carte que j’ai citée. Mais il ne m’a point paru, en dressant la carte de l’Afrique, qu’il me fût permis de confondre on d’identifier ce fleuve avec une rivière nommée Maleg, qui étoit de fort près l’Abawi de l’Abissinie, et lui paroit très inférieure, selon la carte des Jésuites Portugais, sans laquelle on ne connoîtroit point le Rio Maleg.”—‘Mémoires de l’Académie Royale des Inscriptions et Belles Lettres’ (1769), vol. xxvi. p. 60.

‡ “The river Zebée or Kibbee surrounds a great part of the kingdom of Gingiro. *It has been mistaken for the river El Aice* [i. e. the Bañr el Abyad], which runs into Egypt in a course parallel to the Nile [i. e. the Bañr el Azrek], but to the west of it.”—‘Travels,’ vol. ii. p. 318. And again—“*The Zebée is universally allowed by the merchants of this country, to be the head of the river Quilimancy*, which, passing through such a tract of land from Narea to near Melinda, must have opened a very considerable communication with the inland country.”—Ibid.

§ See page 18, note.

|| M. Rochet d’Héricourt in his ‘Second Voyage au Royaume de Choa,’ p. 273, sq., speaks of a river Gúbbe, which rises in Enarea to the S.W. of Shoa, in a mountain (mountainous country) named Bottchia-Magna, runs from E. to W. between Káffa and Kambodá, and then turns northwards, in which direction it probably joins the Nile. Considering the vagueness of the expression “Enarea” (see page 57), it is not easy to determine whether this river in its upper course is the Gúbbe of M. Lefebvre, or the Kúsaro-Gúbbe, or Zebé of Fernandes, which has its source in Bósha; but in its lower course it is manifestly identical with the Gódjeb, the recipient of both the one and the other of those two rivers.—9th March, 1847.

¶ “ . . . Zebée, as the Portuguese call it; but its true name is Kibbee, a name given it by the Mahometan merchants (the only travellers in this country) from its whiteness approaching to the colour of melted butter, which that word signifies.”—‘Travels,’ vol. ii. p. 317.

** This forced derivation of the name “Kibbee” may be adduced in support of the argument in page 52, sq.

spoken in the countries through which the Gíbbe flows, but in that of the natives themselves. Now, of these natives we possess historical evidence of only two distinct races, namely, the Góngas and the Gallas. The former are a people who, previously to the invasion of the Gallas, extended over the whole of the table-land S. of the Abáí, but who have gradually been driven from it by the intrusive race, so that at the present day they are confined to the valley of the latter river towards the N., and to the countries watered by the Gódjeb towards the S. In the time of Fernandes (A.D. 1613) the Góngas were still in possession of Enárea Proper, as well as of other portions of the table-land; and as the river which was then called Zebeé, now bears the name of Gíbbe, it is not unreasonable to regard the latter as a *Galla* designation which, since the time of Fernandes, has superseded the earlier native name, in the same way as within the same short period the Takui has become the Dedhésa. Assuming, then, Gíbbe to be a Galla name, we find in M. Tutschek's 'Galla Dictionary' * the word *gíbe* to mean a "lake," or "standing water," as contradistinguished from *galána*, a "river," or "running stream;" and as Gíbbe thus appears to be not a proper name, but an appellative, we have seemingly a reason for its being applied, as we find it to be, to several rivers. We will now see if any further explanation is to be derived from the earlier name *Zebeé*.

Of several of the languages and dialects spoken among the Góngas, vocabularies are given in the second volume of the 'Proceedings of the Philological Society;' † but, as far as these vocabularies extend, they throw no light upon the subject now under consideration. To the S., however, of the Góngas—or Sidámas, as they are usually called by the Gallas and, in imitation of them, by the Abessinians—comes another far more widely spreading race, respecting which Mr. Cooley observes, ‡ "that from the confines of the Hottentots in the south of the equator on the eastern coast, and to the Camaroons on the western, there is but one family of languages which may be appropriately called the Zingian languages. Notwithstanding the variety of dialects, each tribe can understand its neighbours. There is little reason to doubt that a native of Angola would be soon able to make himself understood in Zanzibar." Of these dialects, the Sawáhili is spoken in Zanzibar and the vicinity, on the eastern coast of Africa; and

* P. 61.—E. g. "Galáni na fiád'e
Gíben na geáze."

"Away the river tore me,
And to the lake fast bore me."

Galla Song.

† Pp. 93-107. Ludolf, in his 'Hist. Æthiop.,' lib. i. cap. 15, gives *one* word of the Gónga language, *donzo*, as meaning "lord," or "master," which corresponds with the *dindjo* (Gónga) and *dono* (Káffa) of my vocabularies.

‡ 'Journal R. G. S.,' vol. xv. p. 193; and see Marsden, in Capt. Tuckey's 'Narrative of an Expedition to explore the River Zaire,' p. 389.

in this language *Zhoa*—in one of the cognate dialects *Zébé*—means “lake,”* in the same way as *Gíbe* does in the Galla.† In this word we have the derivation of the name of the well-known lake *Zuwáá* (Zuwaja) in the S. of Shoa, which is thus seen to be not a proper name but an appellative, just as *Háák* (ዐፄክ *Háyék*) is in Ethiopic. And hence we are led to the probable conclusion, that the name *Zebéé* is even of earlier date than the occupation by the Góngas or Sidámas of the countries watered by that river, and that this word, like *Zuwáá* itself, is a relic of a people of cognate origin with the Sawáhilis, whose settlements once extended even thus far to the north of the equator. In the absence of all historical evidence, or of other corroborative facts, such a derivation can only be put forth as a reasonable surmise. The coincidence in signification of the two names *Zebéé* and *Gíbbé*, is however too close to be well attributable to mere chance; and it is deserving of remark, that, below the confluence of the Gíbbé with the Gódjeb, the united stream bears the name of *U'ma* or *O'mo*, which name (as will next be shown) there is reason for believing to be significant in the languages of Woráтта and Yángaro—both of the *Gonga* family—and in like manner to mean “lake.” That a lake, or series of lakes or marshes, does actually exist along the bed of the Gódjeb, between the two countries of Woráтта and Yángaro, is a fact which cannot well be doubted; but I am not aware of the existence of anything of the sort along the courses of the rivers bearing the common appellation of Gíbbé. Should, however, the fact be, that these various water-courses are not perennial streams like the Abáí, but stand in pools during the dry season like the Máreb, the name would then be satisfactorily accounted for; but upon this subject more information is required before any positive opinion can be expressed.

Having at length terminated our investigation of the several rivers bearing the name of Gíbbé, it is necessary, before returning to M. d'Abbadie's enumeration of the other tributaries of the Gódjeb on its left bank, to consider the question of the existence of a lake or series of lakes or marshes along the course of the Gódjeb. On this point that traveller says—“Le Godjab ne s'épanouit pas en lac dans Kafa;”‡ but this is directly opposed to the evidence of several credible native witnesses, and likewise to the independent testimony of M. d'Arnaud's map, in which the Gódjeb is laid down as running through a lake in the S. of Káffa.§

* See ‘Journal R.G.S.’ vol. xv., p. 203.

† In the Kafir language of the Cape Colony, “a lake” is *Ik'ibi* (with the click on the *k*), written by the missionaries *icibi*. See Ayliff's ‘Vocabulary of the Kafir Language,’ 1846.

‡ ‘Nouvelles Annales des Voyages,’ 1845, vol. i. p. 263.

§ M. Lefebvre's informant Irbo in the like manner speaks quite positively as to the existence of such a lake, or rather of more than one such lake. He says (‘Bulletin,’

Dilbo, who first mentioned this lake, spoke as if it were the main stream of the Gódjeb itself, which he described as being as wide as from Angolálla to Chérkos (about 3 miles English), and as being crossed in boats capable of containing 50 or 60 persons.* The situation of this expanse of water, whether it be regarded as a lake or as the widened stream of the river, was understood from Dilbo's relation to be on the direct caravan-road between Enárea and Káffa. But subsequent information obtained in Gódjam shows that such is not the case, and that it lies further to the S., between Wolámo (or possibly the S. or S.E. portion of Yángaro) on the one hand, and Kúllo in the S. or S.E. of Worátta on the other. An earlier statement of M. d'Abbadie himself may, indeed, be quoted to prove the existence of this lake. He says—"La plus grande rivière est le Godam [Godab, i.e. Gódjeb], puis vient l'Ouma—il peut y avoir quelque incertitude ici, car j'ai appris plus tard qu'en Ilmorma 'ouma' veut dire lac."† By "Ilmorma" is simply meant *Galla*.‡ It is, however, much to be questioned whether úma (ouma) means "lake" in that language. But it may well have that signification in some *other* of the native tongues, and probably in those of Yángaro and Worátta, the countries between which this "U'ma" is situate; and under this view of the subject, the whole would become intelligible and consistent. To use M. d'Abbadie's words in his letter of April, 1844§—"Le fleuve lui-même qui nous occupe est le Godefo ou Godepo des Sidama, le Gódjeb ou Godeb des Gallas, le Omo des Yamma et des Yangara, le Ouma des Dawaro,"|| which, as "*uma* means lake," might be thus explained:—Between Yángaro and Worátta (M. d'Abbadie's Dávaro) the Gódjeb becomes "*úma*," i.e. "a lake;" the fact being the same whether the word "*úma*" (or "*ómo*") be the proper name of the river in that portion of its course, or an appellative in the languages of the two countries between which it flows. It will be seen in my map of the 23rd of November, 1843, that the "lakes or marshes" are laid down at a short distance to the S.E. of the spot where the Gódjeb passes between Yángaro

3rd Series, vol. i. p. 54), that a river joins the Gódjeb from the east, forming at the junction a lake or basin, into which several small Galla rivers discharge themselves. And he adds, that at three days' journey from its source, the Gódjeb passes through another lake in the country of Sidáma (Káffa), which is never crossed by the natives without their first confessing themselves, on account of the frequent loss of life there.

* 'Journal R. G. S.,' vol. xii. p. 87.

† 'Bulletin,' 2nd Series, vol. xviii. p. 355.

‡ *Ilm'orma* (sons of men) is the native appellation of the people: *afan orma* (the "mouth" of men) is that of their language. If, therefore, it were worth while to introduce a substitute for the well-known expression "*Galla*," the proper one would be *Orma* or *Orman* for the people and their language, and *Ormania* for their country. See 'Proceedings of the Philological Society,' vol. ii. p. 96.

§ 'Nouvelles Annales des Voyages,' 1845, vol. ii. p. 115.

|| The Dawaró of Makrisi (Rinck. pp. 11, 13) is probably this country.—F. S.

and Worátta, corresponding very closely with the relative position of the lake in M. d'Arnaud's map. According to Dilbo,* "beyond Kaffa, the Gódjeb is *joined* by the river O'mo, coming from the country of Doko." This was understood as meaning that the O'mo was a *separate* river, in the fork between which and the Gódjeb the kingdom of Káffa was situate.† But M. d'Abbadie's view of the case, as above interpreted, is apparently the correct one.‡

In their first visit to Abessinia, both M. Antoine d'Abbadie and his brother, M. Arnauld d'Abbadie, made mention of "a great salt lake *near Kaffa*," "the salt of which is taken for sale to Kaffa by the people of Worátta."§ In Shoa as well as in Gódjam, I made particular inquiries as to the places from whence Enárea and Káffa are supplied with salt. In the former country, I was told from Tigre, by the way of Gondar and Gódjam;|| and this I ascertained to be the fact from personal observation at Báso. But I there learned further, that but little of the Tigre rock-salt finds its way to Kaffa, that article being carried thither by the Sennár merchants by the way of Wallégga; and also that grain-salt (áshabo) is brought to Káffa *from the Indian Ocean* by the way of Góbo, Worátta, and Dóko. My informants were very precise and positive on this point, saying that the sea which is very near to Dóko, is also *that of the Banians*, with whom and with whose country (Hind) they are acquainted, from having traded with them in the ports of the Red Sea.¶ From these particulars I should be inclined to regard this "great salt lake" of the French travellers as being the Indian Ocean, especially as the same word *bahr* means both "sea" and "lake," as well in the Amharic as in the Arabic language. But in a more recent communication,** M. Antoine d'Abbadie says—"I think I have before spoken to you of the lake beyond Kaffa; and as I had always been assured that its waters are not drunk, I imagined they must be salt. But it is not so: *the water is fresh*,†† but sacred." And he goes on to say that this lake is situate in *Dáwaro* (Worátta), that "it is half as large as lake Tsána, is called Chócha (Tchotcha),‡‡ and stretches from E. to W., its banks being steep hills. *No considerable river*

* 'Journal R. G. S.,' vol. xii. p. 87.

† Dr. Krapf mentions "a large river called Uma," as flowing through Wolámo. See 'Journals of the Rev. Messrs. Isenberg and Krapf,' p. 257.

‡ This opinion has, in fact, been since adopted by M. d'Abbadie himself. See 'Bulletin,' 3rd Series, vol. iii. p. 56, cited in page 59, *note*.

§ 'Bulletin,' 2nd Series, vol. xii. p. 189.

|| 'Journal R. G. S.,' vol. xii. p. 87.

¶ Ibid., vol. xiii. p. 264.

** 'Bulletin,' vol. xix. p. 438.

†† But in that case what becomes of *the salt of this lake*, which was said to be taken for sale to Káffa by the people of Worátta?

‡‡ 'Bulletin,' vol. xix. p. 438.

enters it, and none flow out of it." * This is, however, opposed to all the evidence already mentioned, and especially to that of Dó-djamo (a native of Worátta), who assured me that the lake is a continuation of the Gódjeb, and that it is crossed in boats on the way from Kúllo to Woláitsa or Wolámo.

As regards the further tributaries of the Gódjeb on its left bank, M. d'Abbadie says, that after the Walga and Borara (which, as is already stated, collect the waters of Gurágie) come "the Sánna, which forms the southern frontier of Túfte, and the Wósho, of which the source is in Walámo [my Wolámo or Woláitsa], at the watershed between the basin of the Nile and that of lake Abbale. This lake is said to be 80 miles in length, and to contain several islands inhabited by the Aruro negroes."† In the existing state of our knowledge of these regions, it is not possible to say whether this lake is to be regarded as one of the series of collections of fresh water lying along the easternmost edge of the table-land of Eastern Africa, such as A'shangi, Háik, and Zuwái, or whether it is similar in character to lake Abhébbad, the recipient of the Hawásh, in the low desert country lying between the high land and the ocean.‡

M. d'Abbadie remarks, in continuation, that "the country of the Dóko § (Dokko) must likewise furnish affluents, the sources of which may be presumed to lie as far S. as the 3rd or even the 2nd parallel of N. latitude; but the Dóko, whom we have questioned on the subject, assure us that none of their rivers are to be compared to the Gódjeb." How far the tributaries of the Gódjeb coming from the S.E. and S. really extend, there are at present no means of ascertaining. But the northern limits of the basin of the Shoabérri, of which river we have yet to speak, must prevent that of the Gódjeb from extending much further to the south than about the 5th parallel, unless, perhaps, in the case of some of its tributaries from the extreme edge of the table-land towards the S.E.

The French traveller, from whom we have so largely quoted, concludes by saying—"As to the tributaries of the Gódjeb on the left bank, below the point where its course takes a northerly direction, we may from theory be assured that they are not very nume-

* 'Bulletin,' 2nd Series, vol. xix. p. 441.

† 'Nouvelles Annales des Voyages,' 1846, vol. ii. p. 114.

‡ It may be the great lake mentioned by M. Rochet as situate in Korchási, to the south of Lake Zuwái, through which the Wábbi of Juba—the Wábbi-Giwéyna or Gowin—is said to flow.—12th March, 1847.

§ *Doko* in the Galla language means "stupid," "ignorant." It is not improbable that this is the origin of the name of the rude savages, of whom, from Dilbo's report, such curious tales have been related. They are first mentioned by myself in 'Journal R. G. S.,' vol. xii. p. 87: see also vol. xiii. p. 265, *sq.*, and the 'Literary Gazette,' of the 30th Dec., 1843, p. 851, *sq.*

rous." By this M. d'Abbadie alludes to the direct stream of the Bañr el Abyad above the 10th parallel, with which he supposes the Gódjeb to be identical, but erroneously. The fact is, however, that below the point where the Gódjeb is joined by the Gföbe, nothing whatever is known respecting its tributaries on the left bank: but, from theory, there is no reason for imagining that they are less numerous than those of the Abái on its left bank, the two rivers being in other respects very similar.

We have thus come once again to the Bañr el Abyad in about 9° 20' N. lat. and 31' E. long., where we had left it for the purpose of tracing the Sobát, Téñá, or Gódjeb to its source.

Following the progress of the Egyptian expedition, we now ascend the Nile in a direction almost due W., till, in about 29° E. long., we come to a lake measuring from 15 to 20 miles each way,* abounding in fish, and studded with islands. M. Werne states † that the name of this lake could not be ascertained, because its banks were lined with sedge and shallows; by which it may be presumed it is to be understood that the land was unapproachable so as to allow of communication with the natives. A subsequent traveller, M. Lafargue, who ascended the river in the beginning of 1845, says that this lake is called No: ‡ it is evidently the lake Kúra of the Arabian geographers—the Cuir or Cura of the maps.§ This lake is formed by the junction of two large rivers. The one which falls into it from the S., and up which the several expeditions proceeded, is considered as the main stream of the Bañr el Abyad or Nile: the other, coming from the W. or N.W., was, by several persons who had served under Muṣṭafá Beg, called Bañr el Ghazál, and this name was subsequently confirmed by that officer himself on the return of the expedition to Khartúm. || M. d'Arnaud suggests that it is the Keiláh, or Miselád of Browne. ¶

Above lake Kúra or No, the direction of the Bañr el Abyad for

* This is the size attributed to it in M. d'Arnaud's map; but M. Werne says (p. 48) —"Der See hat 18–20 Meilen im Quadrat," which, if ordinary German miles are meant, would make it to be of considerably greater extent. But probably geographical miles, of 60 to the degree, are intended.

† P. 48.

‡ 'Bulletin,' 3rd Series, vol. iv. p. 160. Riley mentions that, according to Hadji Hamet, *Lake Chad* bears the name of *Nu*. Upon this, Reichard, who as early as 1802 opposed the views generally entertained in England respecting the "Niger," and contended that the Djoliba of Park ran southwards into the Bight of Benin, precisely as the Kwára (Quorra) was found to do by Lander in 1831 (see 'Bulletin,' 3rd Series, vol. i. p. 196):—this learned geographer suggests that the word *Nu* may be an abbreviation of *Nuchul* [or Nuluch], the name given to the lake out of which the Nile (i. e. its great western arm) was considered to issue (see Mela, lib. iii. c. 9; edit. Gronovii, p. 312, sq. and p. 366, sq.). Orosius, lib. i. c. 2, calls this lake *Nukul*.

§ Cuir or Kuir is a false reading of Kúra كورى, the name given in Abú-lfedá, pp. 37, 163.—F. S.

|| Werne, p. 48.

¶ 'Bulletin,' 2nd Series, vol. xviii. p. 90.

the remaining distance through which it has been navigated, has a general bearing of about S.E. It is here called by the natives Kíti and Kírte; but in the country of Bari, Barry, or Bér (Behr), the extreme point attained, it is named Tubiri.* Along its entire course the river is without cataracts, but with occasional shallows, and it winds among marshes and swamps, which are, in part, the beds of watercourses joining the main stream on either side during the rains.† From the character of this country, it is manifest that the inclination of the bed of the stream must be insignificant. But in about 5° N. lat. the valley of the river begins to be confined between mountains, and its bed rises sensibly, so that at length the current attains a velocity of two miles an hour.‡ In 4° 42' 42" N. lat. and 31° 38' long. E. of Greenwich, a ridge of gneiss, running directly across the stream from E. to W., arrested the further progress of the second expedition, the one which reached the highest point.§

Respecting the river further up, the particulars furnished by M. d'Arnaud and M. Werne, from native information, differ materially. The former says,|| "When the waters are high the river is still navigable for at least some 30 leagues," to a point where "several branches unite, of which *the most considerable one comes from the E.*, and passes below a large country ('au bas d'un grand pays') named Berry, situate a fortnight's journey to the E. of the mountains of Bellénia;" which mountains are shown in that traveller's map as lying at a distance of 20 or 30 miles to the E. of the extreme point of the expedition. This branch of the Nile is, in the same map, named *Shoabérri* (Choa-Berry), and the Gódjeb is laid down as tributary to it. On the other hand, M. Werne informs us,¶ that, *in the country of Berri*, which lies 10 days to the E. of Bari, "there is no river, but the people obtain their water from wells." And he adds, that they were informed by Lakono, the reigning Matta (king) of Bari, that the river continues "a month's journey further south before reaching the country of Anyán (Anjan), where it divides into four shallow brooks; but whether these come from the mountains or out of the earth he was unable to say."**

Notwithstanding the apparent discrepancy of these two relations, the accuracy of *both* may, subject to certain qualifications, be admitted, if we suppose that, in the case of M. d'Arnaud, that traveller was induced to consider the *Shoabérri* to be the *principal* arm by the particulars furnished to him in Egypt by Messrs.

* Werne, p. 49.

† Ibid., p. 48.

‡ Ibid., p. 49. These are apparently geographical miles, but they might possibly be usual German miles, each equal to four geographical.

§ Ibid. Is it not possible that the expedition had here got out of the main channel of the Nile, without being aware of having done so?

|| 'Bulletin,' vol. xix., p. 93.

¶ P. 50.

** Ibid.

Blondeel and Bell respecting the Gódjeb, which river was described to them by their native informants as being the main stream of the Bahr el Abyad. This information must, however, be viewed in the same light as the various native reports already commented on, which are founded on the belief of the people inhabiting the banks of each successive branch of the Nile, that *their* river is the continuation of the principal stream. By this observation, it is not intended to express any doubt respecting the existence of a large eastern arm of the Bahr el Abyad above the furthest point reached by the expedition: the particulars subsequently furnished by M. d'Arnaud to M. Jomard—namely, that “almost all the natives concur in stating that the river continues in a S.E. direction for 50 or 100 miles, but afterwards turns to the E. and N.E.,”*—do not allow this fact to be questioned. All that is contended for is, that the river thus described is neither the Gódjeb nor, in its upper portion at least, the direct stream of the Nile. As respects the former of these points, the real course of the Gódjeb is, it is apprehended, sufficiently established in these pages; and as to the latter, its correctness must be admitted unless we altogether discard M. Werne's information, which we certainly are not justified in doing. And, indeed, M. d'Arnaud himself was informed of a river which comes from the *south*, by the people of Comboh, a place distant a day and a-half's journey beyond the furthest point reached by the expedition.†

It appears, therefore, to result that the Shoabérri of M. d'Arnaud's map is *another* great arm of the Nile, having its course below and round, consequently *beyond*, the country of Berri; but not *in* it, since M. Werne expressly tells us the people of that country obtain their water from wells and not from a river. The distance at which it makes this circuit round Berri, namely 15 days' journey, may be estimated at from 180 to 200 miles to the E.; so that the course of the river will be carried to about the 35th meridian E. of Greenwich, and its source may be conjecturally placed somewhere between the fourth and fifth parallels of N. lat. Thus the Shoabérri will be seen to form a curve similar to that of the Abáí and of the Gódjeb; while towards the Nile its lower course will have precisely the same bearing as those two rivers and the Tákkázie, namely from S.E. to N.W. Indeed, from the general fall of the western slope of the mountain-chain of Eastern Africa towards the valley of the Nile, this last condition is indispensable; for it may be regarded as physically impossible, that any river joining the main stream on its right bank, should have a course of 350 miles from N.E. to S.W., as

* 'Bulletin,' vol. xix. p. 444, sq.

† Jomard, 'Observations sur le Voyage au Darfour,' p. 31.

the Shoabérri is made to have in M. d'Arnaud's map, evidently from a desire to connect it with the Gódjeb.

As regards the direct stream of the Nile above the confluence of the Shoabérri—assuming the Tubiri to be that direct stream—our guide must be M. Werne, on whose authority, or rather on that of his informant, Lakono, we have to carry it a month's journey further to the south. If, now, the day's journey be roughly estimated at 12 geographical miles, this gives 360 geographical miles as the length of the river above $4^{\circ} 42' 42''$ N. lat.; and this distance, measured in a direction due S., brings us to about $1^{\circ} 20'$ S. lat. and $31^{\circ} 40'$ E. long.* Here, in the country of Anyán, the river is said to divide into four shallow brooks; and beyond this point our information, imperfect as it is, ceases altogether.†

Let us now see into what portion of Africa the head of the Nile has thus been brought.

In Mr. Cooley's valuable memoir on 'The Geography of N'yassi, or the Great Lake of Southern Africa'—the lake Zam-béze ‡ of the Portuguese—published in the fifteenth volume of the Society's 'Journal,' § public attention is again directed to the country of *Móno-Moézi*, which, as early as the end of the sixteenth century, was described by the Portuguese as an important empire in the interior of Africa. Since that period, however, as Mr. Cooley observes, || "our acquaintance with it has not only not gone on increasing, but the very name has sunk into obscurity. The information which we at present possess respecting it is of but a vague and general character. The country seems to be an elevated plain, the ascent to which lies chiefly in the territories of the M'sagára and of the Wohaha;"—similar, in its general character, to the ascent from the low country of the Adál or Danákil to the Abessinian plateau, of which this "elevated plain" is manifestly a continuation.

* It must be understood that this is a mere approximation.

† M. Lafargue, who ascended the Bahr el Abyad in 1845, says, that according to the report of the negro subjects of King Lakono, the *second* branch of the Nile which he ascended—the Bahr el Ghazál, or Keiláh, is regarded by him as the *first*—turns to the west at a distance of 6 days' journey from the extreme point reached by him. See 'Bulletin,' 3rd Series, vol. iv. p. 161. While M. d'Arnaud had his attention more particularly called to the Shoabérri, which joins the Nile from the east, M. Lafargue's inquiries would seem to have been especially directed to the tributaries on the western bank. This will not only account for the apparently conflicting testimony of the two travellers, but may also reconcile them both with M. Werne. The general conclusion to be arrived at from the whole is, that far to the south of 5° N. lat. the Nile is still a very large river, with considerable streams falling into it both from the east and from the west.

‡ This name is usually misprinted Zembere, Zembre, or Zambre. It is the lake *Meravi* of the maps.

§ Part ii. p. 185, *seqq.*

|| 'Journal R. G. S.,' vol. xv. p. 212.

The country of Mónico-Moézi appears to lie to the N. and N.E. of lake Zambéze; and, from a consideration of the positions of the adjoining districts, Mr. Cooley concludes that its northern limit may be "rudely fixed in the third or fourth parallel of S. lat.;"* and in the map accompanying his Memoir it is laid down as extending from the 30th to the 35th meridian of E. long. But, in his 'Further Explanations in reference to the Geography of N'yassi,' contained in the succeeding Part of the Society's 'Journal,'† that gentleman, at the same time that he shows, from information subsequently obtained, the general correctness of his previous results, admits that he has "fallen short of the truth by about 150 miles" with regard to the position of certain points on which those of the central portion of his map mainly depend, the deficiency in distance being on a line bearing about N.W. This variation necessarily affects, though perhaps not to the whole extent, the position previously attributed to the N'yassi, or lake Zambéze, and consequently that of the country of Mónico-Moézi also; and hence the approximate northern limit of that country has probably to be advanced to within two degrees S. of the equator, while it may at the same time be necessary to move it westwards to within the 29th and 34th meridians of E. long. Now, this brings us precisely to the spot to which, on the authority of M. Werne, we have already carried the head of the Nile; so that it results that this river has its origin in the country of *Mónico-Moézi*. This is, however, only a reproduction of the long-discarded and almost-forgotten opinion of the Portuguese writers of the sixteenth and seventeenth centuries, who concur generally in stating that the Nile flows from lake Zambéze, *in the empire of Mónico-Moézi*, which country they further describe as lying immediately round the "Mountains of the Moon."

It is true that the river "Nile" which they thus make to flow from lake Zambéze is not the Baḥr el Abyad, but the *Takui*,‡ the western arm of the Baḥr el Azrek. But this is an error, the origin and progress of which may readily be traced; and its detection will serve to explain how it has happened, that, in the maps of Africa of the seventeenth century, the empire of Abessinia is stretched out so far to the S. and W. as to cover almost the whole of the interior of the African continent. The state of the case is briefly as follows:—

By Ptolemy we are informed§ that the river of Egypt is composed of three great arms, the Astaboras, the Astapus, and the Nilus. Of these the Astapus flows from lake Coloë, while the Nilus is formed of two rivers, having their sources in the

* 'Journal R. G. S.,' vol. xv. p. 213.

† Vol. xvi. p. 138, sq.

‡ De Barros, 'Asia,' vol. iii. part. ii. p. 373.

§ Lib. iv. cap. viii. p. 113 (edit. Bertii, p. 129).

"Mountains of the Moon,"* each of which rivers passes through a lake before uniting to form the Nilus. This statement of Ptolemy forms the groundwork on which the Portuguese engrafted the positive information obtained by them in their possessions on both shores of the continent and likewise in Abessinia. In the former they became acquainted with the great lake, called by them Zambéze, from which the Nile of Egypt was said to flow, and which lake they had no difficulty in identifying with the easternmost of Ptolemy's two lakes. Of the other lake described by that geographer as lying far to the W. they appear to have had no knowledge. In Abessinia, on the other hand, they ascertained the existence of the Tákkazie and Abáí, and became acquainted with the fact that the latter flows through lake Tsána; so that they readily identified those two rivers with the Astaboras and Astapus, and lake Tsána with the Coloë of Ptolemy. Thus far all was clear, and (as now appears) in accordance with the truth. Of the western arm of the Nilus of the Greek geographer they knew absolutely nothing; and of its eastern arm they appear only to have learned, in a general way, that it came from lake Zambéze. With its course as the Bahr el Abyad they were personally unacquainted, and from the Abessinians they were not likely to learn anything, owing to the ignorance of that people even of that river's existence.† But they did learn in Abessinia that *the Bahr el Azrek* was, as it still is, considered by the natives to be the true Nile and the Gihon ‡ of Genesis, and that it is composed of *three* rivers, the Tákkazie, the Abáí, and the Takui; and as they identified the two former with the Astaboras and Astapus, it was only natural that they should regard the remaining river, the Takui, as the Nilus. This identification having once been adopted, it followed as a necessary consequence that the Takui—the pseudo-Nilus—must have its origin in lake Zambéze; and that it does so is expressly asserted by de Barros.§ But the sources of the Takui are not less expressly described by the same writer|| as being situate in Shínasha, Dámot,¶ and Bizámo, all well-known provinces of Southern Abessinia; and as the Portuguese who visited that country prior to the commencement of the seventeenth century, appear not to have possessed the means of deter-

* Lib. iv., cap. ix. p. 115 (edit. Bertii, p. 131).

† In proof of this, see page 29, sq.

‡ It is called Sîhon (Saihûn) by Makrizî (Rinck., pp. 2, 36).—F. S.

§ "E destas tres notaveis rios, que ao presente sabemos procederem deste lago, os quaes vem sabir ao mar tão remotos hum de outro; o que corre per mais terras he o Nilo, a que os Abesays da terra do Preste João chamam Tacay, no qual se mettem outros dous notaveis, a que Ptholemeu chama Astabora, e Astapus, e o naturaes Tacazy, e Abanhî [Abahui=Abáwi, i.e. Abáí]."—'Asia,' vol. iii. part i. p. 373.

|| Ibid. See the passage cited in page 29.

¶ i. e. the ancient Damot, south of the Abai.

mining the latitude so as absolutely to fix the position of those distant provinces, there was no good reason why those provinces should not accompany the Takui, in its character of the Nile, southwards into the vicinity of lake Zambéze, the latitude of which was approximately known from the settlements in Kongo and Şofálah. The error, great as it was, did not, however, terminate here. Lake Tsána (Coloë), from which the Abá'i, the central stream of Abessinía, issues, was known to be situate in or near to the province of Gódjam, which province was in like manner known to border on Shinasha, Dámot, and Bizámo; and as these latter provinces had been removed to the neighbourhood of lake Zambéze in company with the Takui, there was no alternative but to carry Gódjam, with the Abá'i and lake Tsána, in like manner away to the S.; so that it resulted that this latter lake was made to usurp the place of the Zambéze, and to become Ptolemy's eastern lake.* In the beginning of the seventeenth century, the Portuguese Jesuits, by observing (if even roughly) the altitude of the pole in Abessinía, and likewise by tracing the curve of the Abá'i round Gódjam, were enabled to correct this fundamental error in African geography, so far as the Abá'i and lake Tsána are concerned. But they had, of course, no means of appreciating the mistake with respect to the Bañr el Abyad; and as by that time the southern provinces of Abessinía were overrun by the Gallas, the Jesuits would seem not even to have acquired any knowledge of the Takui or western arm of the Bañr el Azrek.† The confusion in the maps remaining thus inexplicable, the information of the early Portuguese, which is really most valuable if understood, has been tacitly allowed by later geographers to sink into oblivion. However, from the explorations and researches of the last few years, and principally from the positive information respecting the Bañr el Abyad obtained by the Egyptian expeditions up that river, a new era in the history of the basin of the Nile has now commenced, which pro-

* Thus Telles says, in speaking of Lake Tsána, "Chamou Ptolomeu a esta alagoa, Coleo, Joam de Barros lhe chama Barcená [Bañr Tsána], a respeito parece de hũa ilha que está junto ao lugar por onde o Nilo sae. Os douttissimos Gerardo Mercator e Joam Janonio nas suas famosas taboas da Abassia poem dous nomes a esta alagoa, e chamam Zambre [Zambéze] a parte que fica pera o Sul, e dizem Zaire a que oha pera o Norte. Porém o seu nome como ja dissemos he Bar Dambeá."—'Historia, &c.' p. 14.

So, too, dos Santos says:—" . . . O rio Nilo, o qual nace no sertão desta Ethiopia da hum grande lago chamado Barzêna [Bañr Tsána] situado em doze graos da banda do Sul."—'Ethiopia Oriental,' Part. i. liv. iv. cap. xiii. fol. 104.

As a consequence of this confusion of lake Tsána with lake Zambéze, the Wábbi, and afterwards the Zebé, was made to be the head of the Kilimáno. See on this subject page 17, *note*.

† Hence it arose that the Portuguese Jesuits, though they correctly considered the Abá'i and Lake Tsána to be the Astapus and Coloë of Ptolemy, were yet guilty of the inconsistency of making the former river to be, *at the same time*, the Nilus of that geographer.

mises to be far more fruitful in results than any that have preceded it, not merely as regards our knowledge of the vast regions watered by that still mysterious river, but likewise, as it is fervently to be hoped, in the improvement of the millions of our fellow-creatures with whom those regions teem.

After what has been already stated, there scarcely remains room to doubt the fact that the head of the direct stream of the Bahr el Abyad, or Nile, is in the country of Mónico-Moézi; and such being the case, there is nothing unreasonable in the opinion maintained by the early Portuguese, that that river issues from Lake Zambéze, situate in that country. Indeed, that such is actually the case, is repeated at the present day by a native of Zanzibar, but born of Mónico-Moézi parents—one “of the *Manmoise* tribe,” as he is styled by Mr. McQueen, who communicated the information.* This individual, Lief ben Saied by name, states that “it is well known by all the people there that *the river which goes through Egypt takes its source and origin from the lake*,” † namely, Zambéze or N’yassi.‡

Another point to be noticed is Ptolemy’s well-known statement that the Nile rises from the “Mountains of the Moon.” These mountains, he says,§ stretch from E. to W. across the continent for a distance of 10 degrees of longitude, and at their *eastern* extremity is one of the two lakes from which the Nile issues, that is to say, the head of the great eastern arm of that river. And in describing the western shores of the Indian ocean, he says || that on a large bay or gulf in the coast of Africa, called “Barbaricus Sinus,” there dwells a nation of Anthropophagi, *the western part of whose country extends to the Mountains of the Moon*. Our actual knowledge of these regions may be insufficient to enable us to determine the precise position of the country of the Anthropophagi: but it may, in a general way, be asserted that it is that portion of the belt of low land extending along the coast of Zanzibar, which lies below the eastern flank of the table-land of Mónico-Moézi, in which lake Zambéze and the head of the Nile have already been placed.¶

* ‘Journal R. G. S.’ vol. xv. p. 371, *sq.*

† *Ibid.*, p. 373.

‡ If this information and that of the early Portuguese be correct, there is reason for believing that the Egyptian expedition, in the extreme portion of its voyage, had left the main channel of the Nile; and the Tuhiri will be only another of its principal arms.

§ Lib. iv. cap. ix. p. 115 (edit. Bertii, p. 131).

|| *Ibid.*, cap. viii. p. 113 (edit. Bertii, p. 129).

¶ If the *Mountains* of Ptolemy be not Madagascar, but the island of Zanzibar, as was contended by d’Anville (‘Mémoires de l’Académie des Inscriptions et Belles Lettres,’ vol. xxxv. 1770, p. 593, *sq.*), and has lately been argued with much ability by M. de Frobenius (‘Bulletin,’ 3rd Series, vol. i. p. 324, *sq.*), it will follow that the position of the Barbaricus Sinus, and consequently that of the country of the Anthropophagi and of the “Mountains of the Moon,” may be determined with great precision.

It is likewise to be remarked, that, in a passage cited by De Sacy from Makrizi,* it is stated that *the mountains along the eastern coast of Africa*—opposite the great island (i.e. Madagascar) in the sea of Zingebár facing Ceylon [Silán],—are called جبل القمر; and if this statement is to be regarded, not as a mere variation and amplification of the earlier one of Ptolemy, that the country of the Anthropophagi reaches westwards to the "Mountains of the Moon," but as the assertion of a *fact*, of which the Arabian writer had acquired an independent knowledge (whatever fanciful derivation he may have chosen to give to the name جبل القمر), it affords a further confirmation of the results already arrived at from so many totally distinct and unconnected sources.

Thus, in the construction of this theory as to the position of the head of the Nile, all the materials, from whatever quarter collected, converge to the same point. The arch is formed, with the exception of the key-stone, and this is supplied by the signification of the expression "Móno-Moézi." This name is a compound word, of which the latter component alone is properly the name of the country, the former, *Móno* or *Máni*, signifying "king."† Hence we find Kongo spoken of by Alvarez as the kingdom of *Manicongo*,‡ and the Portuguese settlements in Africa are styled the country of *Mani-Puto*§ and so the empire of *Móno-Muézi* is that of the *king* of Moézi. Now, in the languages extending over the whole of Southern Africa, and of which that of the country of *Móno-Moézi* itself is a principal dialect, the word *Moézi*, in various forms, means "the moon."|| And as Ptolemy was told, and as the fact now appears to be, that the source of the Nile is in *the mountains*, or hill-country, of MOEZI, we are warranted in concluding that he merely *translated* that expression into τῶν ΣΕΛΗΝΗΣ ὄρος,—*the mountains of THE MOON*. We may hope,

* 'Relation de l'Egypte,' par Abd-Allatif, p. 7. See the *note* in page 62 of the present Essay.

† Mr. Cooley says ('Journal R. G. S.,' vol. xv. p. 211)—"The name Monomoëzi, or, as it might perhaps be better written, M'wána-M'wézi, is a political appellation, *M'wána* implying sovereignty. . . . From Congo across to Zanzibar this word takes the various forms of Mani, Muene, Muana, and Buana, which last signifies *master* in Sawáhili. The original meaning, however, of the word, which is always prefixed to the name of the land giving the title, is probably very different. The geographers of the seventeenth century took care to point out the fact that 'the empire of Monomoëzi lies immediately round the Mountains of the Moon.' They would have been delighted had they known that Moézi signifies, in Sawahili and Mucaranga, the moon—in Bunda, riégi or moégi."

‡ See page 60, *sq.* of this Essay.

§ Pigafetta, in Purchas's 'Pilgrims,' vol. ii. p. 1007; and see p. 1009, *sq.*, where other similar instances are cited.

|| In Sawáhili and Mucaranga, *moézi*; in Bunda, *moégi* (Cooley, in 'Journal R. G. S.,' vol. xv. p. 211); in Monjou, *muézi* ("mooeize"—Salt's 'Voyage to Abyssinia,' Appendix, p. i.); in Kongo, *moézi* ("mooezy"—Marsden, in Tucker's 'Narrative,' &c., p. 389); and in Mozambique, *moézi* ("mooyé"—*Ibid.*).

therefore, to have at length found the key to the *arcanum magnum* of geography. And as it will thus result, that the source of the Nile is situate at a comparatively short distance from the sea-coast within the dominions of the Imám of Maskat, the friend and ally of the principal maritime powers of the world, there cannot exist any obstacle of moment in the way of setting at rest this great geographical problem, which for thirty centuries has riveted the attention of the civilized world, at the same time that it has baffled the attempts to solve it made by the most celebrated rulers of Egypt, from the Pharaohs down to Mohammed 'Alí.

Having thus traced the Nile to its source, and considered all its tributaries on the right bank as far as they are known to us, it is proper that we should take a general survey of the country in which these streams take their rise, as the means of forming a correct idea of the physical configuration of that portion of the African continent which forms the eastern moiety of the basin of the Nile.*

Till very recently we were but imperfectly acquainted with the true character of the high table-land, in which the numerous head-streams of the great river which forms the subject of the present Essay have their origin. The existence, at a short distance from the sea-coast, of an elevated country, possessing, in consequence of its elevation, a mild and temperate climate, has indeed been well known since the time of the residence of the Portuguese in Abessinia from the fifteenth to the seventeenth century. That in this high country are more elevated spots, such as the mountains of Samien in northern, and of Gódjam in southern Abessinia, where frost and snow exist, was likewise known to us from the same sources. But so limited and imperfect was the general view taken of this high land by the Portuguese, and so little had the accounts of subsequent travellers tended to extend that view, that only five and twenty years ago, when that able geographer, Professor Ritter, proceeded in his usual masterly way to generalise from their data, he was led to regard the Abessinian plateau as consisting of a *succession of terraces rising one above the other*, the lowest being towards the Red Sea, and the highest being in Enárea, where the line of separation between the waters flowing to the Nile and those of the rivers having their course to the Indian ocean was considered to exist.†

* The remarks which follow are taken, with some modifications, from a memoir read at Southampton on the 16th September last, before the Section of Geology and Physical Geography of the British Association for the Advancement of Science; an abstract of which memoir is printed in the 'Report of the British Association,' for 1846: 'Transactions of the Sections,' p. 70, seq.

† 'Erdkunde,' Afrika, vol. i. p. 183.

Dr. Rüppell was the first to show the erroneous nature of the general view thus taken by his learned countryman.* From the section of the country between the shore of the Red Sea at Masówah and the first bridge over the Abai, which section is published in the 'Monatsberichte' of the Geographical Society of Berlin,† it is manifest that, so far from the high country rising in terraces as it recedes from the coast, its summit line is towards the coast itself, and that from thence the land falls gradually towards the interior. This view of the nature of the country is entirely corroborated by the N. and S. section, continuing that of Dr. Rüppell, from the upper bridge as far as the southern limit of the Abáí in about 10° N. lat., and by the E. and W. section extending from 43° E. long. to near 36° E. long., contained in the fourteenth volume of the 'Journal of the Royal Geographical Society.' From these sections it appears that at Hálaí, on the summit of the ascent of Mount Taránta, at a distance of not more than 23 geographical miles from the Red Sea at Zúllah (Adúle) near Masówah, the edge of the table-land has an absolute elevation of 8625 English feet; which gives a rise of as much as 1 in 16·15—equal to an angle of 3° 33'—to the eastern slope of the table-land, or, as it may be more correctly called, the broad mountain-chain of Abessinia. On the other hand we find, that at Khartúm, at the junction of the Blue River with the Nile, in nearly the same latitude as Hálaí, and at a distance of about 380 geographical miles from that place, the elevation of the Nile above the ocean is 1525 feet.‡ The fall in that direction is therefore only 1 in 324; which gives rather more than 10½' of a degree as the angle of the western counter-slope towards the interior of the continent. Consequently, on a line along the 15th parallel of N. lat., the eastern slope of the Abessinian mountain-chain towards the sea, is to the western counter-slope towards the Nile, as 20 to 1.

This proportion may perhaps be rated somewhat too high, in consequence of its being estimated on a direct E. and W. line, whereas it ought rather to be calculated on a line in the general direction of the courses of the principal rivers, namely, from S.E. to N.W. It happens, however, that we possess the means of ascertaining the proportion in this direction likewise. Khartúm, the elevation of which city is 1525 feet as already stated, lies very nearly to the N.W. of Mélka-Kúyu, the ford over the Hawásh on the way from Tadjúrrah to Shoa, at which spot the absolute ele-

* 'Reise in Abyssinien,' vol. i. p. 304. And see Berghans's 'Annalen,' 5th Series, vol. i. p. 56.

† Part ii.

‡ i. e. 1431 French feet. See Ruesegger, 'Reise in Europa, Asien, und Afrika,' vol. ii., part i. p. 544.

vation of that river is about 2200 feet. The height of the eastern edge of the table-land on the summit of the ascent of the Chákka mountains behind Ankóbar, the capital of Shoa—which spot is not very far removed from the direct line between the two extreme points—is about 9000 feet; and as this spot is 38 geographical miles from Mélika-Kúyu, it gives a rise of 1 in 38·89 to the eastern slope, equal to an angle of $1^{\circ} 41'$. On the other hand, the distance from the summit of the Chákka to Khartúm being about 530 miles, the fall of the counter-slope is 1 in 429, equal to an angle of $8'$. These calculations make, therefore, the proportion of the two slopes to be as 12·6 to 1.

It will be observed, that in the latter instance the eastern slope is taken, not from the level of the ocean, but from that of the Hawásh, which has an elevation of 2200 feet; that river being here the recipient of the waters of the eastern slope, in the same way as the Nile itself is the recipient of those of the western counter-slope. From the Hawásh to the sea is about 200 miles, which gives a fall of 1 in 550, equal to an angle of $6\frac{1}{4}'$ of a degree, for the dip eastwards of the low desert country between the Hawásh and the Indian Ocean, inhabited by the Beduin Dan-káli tribes.*

As regards the western part of the counter-slope of the Abesianian chain, it would seem that the fall of the land towards the Nile is there considerably more abrupt than it is on the eastern portion of that counter-slope, so that the surface of the table-land—the broad summit of the mountain-chain—itself approaches more to a level. But it is nevertheless certain that the latter is in no part absolutely horizontal, and that, in fact, the general dip westwards commences from the easternmost edge of the plateau.

As a whole, this table-land may be described as a succession of extensive undulating plains, declining very gradually towards the W. and N.W., and being intersected by numerous streams; which streams, after a short course on the level of the plateau, fall abruptly into deep-cut valleys, in which they soon reach a depression of from 3000 to 4000 feet below the general level of the table-land. The valleys of the larger streams are of considerable width: that of the Abá'i, to the S. of the peninsula of Gódjam, is at least 25 miles from the extreme points where it breaks from the table-land on either side. And as the country within these valleys is exceedingly wild and irregular, possessing all the cha-

* In this country, at about 25 miles to the west of Tadjúrrab, is situate the salt lake, Asal, which is remarkable for its great depression below the level of the ocean. This depression, which was first ascertained in 1840, was estimated by me at 760 feet ('Journal R. G. S.,' vol. xii. p. lxxi.) Since then it has been measured barometrically by Lieut. Christopher (*Ibid.*, vol. xii. p. 222), and M. Rochet d'Héricourt ('Second Voyage à Choa,' p. 316); the former of whom makes it to be 570 feet, and the latter 217·7 mètres, or 714 feet.

acters of a mountainous one, nothing is easier for a traveller, who has not first taken a comprehensive view of the entire region, and who, on crossing a river, finds himself shut up within a mass of broken country rising around him on all sides to a relative elevation of 3000 or 4000 feet, or even more, than to suppose that, in ascending this broken country on either side, he is crossing a mountain-chain; whereas, on reaching the summit, he has merely arrived upon the table-land. It is important to bear this in mind in the perusal of the works of travellers in Abessinia, many of whom, under the impression thus alluded to, place *mountains* where mountains, in the ordinary acceptation of the term, do not exist.

Besides the inequalities of surface occasioned by the deep valleys of the rivers, the uniformity of the table-land is further broken by *higher* mountain masses, which in some parts, as in Sámien, A'ngot, Gódjam, Miécha, Káffa, &c., attain an absolute elevation of from 11,000 to 15,000 feet. As far, however, as our present knowledge of them extends, these greater elevations do not form parts of any regular system, but appear to be distinct isolated masses, unconnected either with each other or with the general bearing of the entire plateau.

As already mentioned, the rivers of Abessinia, in the early part of their courses, flow over the level surface of the table-land, being little better than muddy brooks, which in the dry season are nearly without water, but which during the rains overflow their banks so as almost entirely to inundate the plain country. Where they begin to break from the level, which they do by fissures in the rocky surface, at first only a few yards in width but gradually opening to the extent of several miles, they at once form cataracts of 80 or 100 feet, and in some cases much more, in height, and then continue down a succession of falls and rapids, so as to descend several thousand feet in a course of a few miles. For example, the absolute elevation of the Abáï just above the cataract of *T's Esát*, or the "Smoke of Fire," in the N.E. of the peninsula of Gódjam, is about 6000 feet; while at the "Broken Bridge," only 25 miles lower down the stream, it has already descended upwards of 2000 feet, or 80 feet per mile, its height there being 3852 feet; and in the next 80 miles of its course it falls nearly 1000 feet more.* So too, the Chácha and Berésá, two of the sources of the Djámma, a principal tributary of the Abáï, flow over the plain on either side of Angolálla, the Galla capital of Shoa, at an absolute elevation of about 8500 feet; at only 100 miles from thence, the Djámma joins the Abáï a few miles below the ford of the Dérra Gallas, on the way to Gódjam,

* See 'Journal R. G. S.,' vol. xii. p. 233; vol. xiv. pp. 28, *sq.*, 49, 66, *sq.*

where I found the elevation of the latter river to be 2936 feet, which gives a fall of about 5600 feet, or 56 feet per mile on the entire length of 100 miles.*

The fall of the tributaries of the Nile diminishes gradually as they flow north-westwards to join the main stream, which latter, skirting, as it does, the western flank of the high land, is the *sink* into which the Tákkázie, the Bahr el Azrek, the Gódjeb Télfí or Sobát, the Shoabérri, and whatever other rivers there may be, are received; its current being sluggish, and (as would appear) almost stagnant in the upper part of its course, except during the floods. In the dry season its bed would indeed almost seem to consist of a succession of lakes and swamps, rather than to be the channel of a running stream.† At Khartúm, at the confluence of the Bahr el Azrek, we have seen that the height of the bed of the Nile above the ocean is only 1525 feet, and it is

* Mr. McQueen, in his 'Geographical Memoir,' prefixed to Messrs. Isenberg and Krapf's 'Journals,' pp. [35] and [72], objects generally to the estimates of elevation of the beds of the rivers Abáí and Tákkázie respectively, made by Dr. Rüppell and myself, as being opposed to those of Bruce. This latter traveller (vol. iii. p. 642) calculates the source of the Abáí to be "more than two miles above the level of the sea," which, as two statute miles are equal to 10,560 feet, may be taken at 11,000 feet in round numbers. I estimated it by means of the hypothermometer at 8770 feet, or probably a trifle more (see 'Nouvelles Annales des Voyages,' 1846, vol. iii. p. 224, sq.); and M. d'Abbadie by the same means made it to be 9206 feet (*ibid.*). Hence the true elevation of the source of the Abáí may be stated, in round numbers, at 9000 feet, or 2000 feet lower than Bruce's estimate. Further, Mr. McQueen states that Bruce calculated the plain of Sennár (which is but little above the river) to be about 5000 feet above the level of the sea. M. Russegger ('Reise, &c.,' vol. ii. part i. p. 544) has however determined the elevation of the bed of the Nile at Khartúm, the present capital of Sennár, to be only 1431 French, equal to 1525 English feet, or about 3500 lower than Bruce made it to be. Thus it must be admitted that Bruce's estimates are erroneous, and that any arguments founded on them are consequently inconclusive. Upon a proper comparison of the several heights determined by Dr. Rüppell, M. Russegger, and myself, quite independently of each other and in different parts of the valleys of the Nile and its tributaries, it will be found that they are entirely consistent and confirmatory of one another. When Mr. McQueen expressed the opinion (*loc. cit.*) that "there are certainly neither cataracts nor rapids in the stream of the Abawi from its sources to the point where Dr. Beke first crossed it [between Shóá and Gódjam, in about 10° 15' N. lat.], to account for 7340 feet [it should be only 6000 feet, namely 9000—3000, instead of 10,340—3000], the difference of elevation in the comparative short space of 250 miles," he was, of course, unaware of the fact that, between the two bridges, a distance of only *one-tenth* of that mentioned by him, the Abáí falls upwards of 2000 feet. (See 'Journal R. G. S.,' vol. xiv. p. 49.) And if to this be added the rapid fall which the river is known to have between its source and Lake Taína, we shall have no difficulty in accounting for the whole difference of 6000 feet in 250 miles. [Since this Paper was read I have seen M. Rochet d'Héricourt's 'Second Voyage au Royaume de Choa' (8vo. Paris, 1846), in pp. 316—332 of which work are given various elevations determined by him with the barometer, which are entirely confirmatory of the results arrived at by myself. The Chácha is found by him to have a difference of level of no less than 1294 mètres, or 4245 English feet, in the short distance of twelve leagues.—9th March, 1847.]

† May not Lake Zambeze or N'yassi be the continuation of this series of lakes? In this case it would be simply the upper course of the Nile. N'yassi, according to Mr. Cooley, means "the sea,"—that is to say, the *bahr* of the Arabs and Abessinians, which term is used to signify not only a sea or a lake, but also a *large river*.

far from improbable that even as high up as the fifth parallel of N. lat. its absolute elevation does not much exceed 2000 feet.

A remarkable peculiarity of most of the principal rivers thus joining the Nile is, that they have a spiral course; so that, after having formed a curve of greater or less extent—mostly, as would appear, round the isolated mountain masses—they return upon themselves at a comparatively short distance from their sources. As instances are to be mentioned the Máreb, the Béllegas, the Abá'i, the Gíbbe of Bósha (the Zebeé of Fernandes), the Gódjeb and the Shoabérri; and as Ptolemy speaks * of the *snows* of the mountains of "Moézi," it is far from improbable that the head stream of the Nile has a like spiral course round a lofty mountain mass, similar in character to the snow-topped mountains of Sámien and Káffa.

All the streams of the plateau or western counter-slope of the Abessinian chain are affluents of the Nile, and their easternmost branches take their rise at the extreme eastern edge of the tableland, which is the limit of the basin of the Nile, and the water-shed between its tributaries and the rivers flowing E. and S.E. towards the Indian Ocean. On the seaward side of this watershed, the declivity being much more abrupt and its extent much more limited, the rivers must necessarily be of secondary importance. Thus, proceeding from the N., we do not meet with a stream deserving of name until we come to the Hawásh, and even that river is, near Aussa, lost in lake Abhébbad before reaching the ocean.† The river Haines of Lieut. Christopher,‡ which is the next in succession, appears, in like manner, not to have sufficient power to reach the sea, at least not at all times of the year. Further to the S. we find the river Gowín [i. e. Wábbi-Giwéyna§], or Jubb, possessing a substantive character as an ocean stream; but this river, during the dry season, has at its mouth a depth of only two feet.¶ At a short distance to the S. of the equator is the Ózay, which river, though said to be of great extent, has very little water at the entrance.¶ Further S. the same law appears to prevail; as is exemplified in the Lufji or Kwávi (Quavi), the Livuma, and the Kwáma (Cuama) or Kilimáne (Quilimane), which rivers rise on the eastern edge of the elevated plain in which lake Zambéze or N'yassi is situate, and flow into the Indian Ocean. Here, however, the southern extremity of the basin of the Nile having been

* Lib. iv. cap. ix. p. 115 (edit. Bertii, p. 131).

† 'Journal R. G. S.,' vol. x. p. 580; vol. xiv. p. 69.

‡ 'Journal R. G. S.,' vol. xiv. p. 96.

§ See page 46, note.

¶ 'Bulletin,' 3rd Series, vol. ii. p. 121.

¶ 'United Service Journal,' 1845, part i., p. 127. Between Mónbasah and Zanzi-bar, Dr. Krapf found no rivers of any size. See 'Bulletin,' 3rd Series, vol. iii. p. 68.

passed, the larger streams of the counter-slope no longer join that river, but take their course westwards into the Atlantic, belonging in fact to a distinct hydrographical basin. Thus the recondite Jesuit, Father Athanasius Kircher, in his '*Mundus Subterraneus*,'* is quite right in substance, if not in form, in placing in "the Mountains of the Moon"—that is to say, in the mountains of *Moézi*—the great *hydrophylacium* of the continent of Africa—the central point of division between the waters flowing to the Mediterranean, to the Atlantic, and to the Indian Ocean.

It has already been observed that several lakes of some magnitude are situate along the axis of the mountain chain—namely, A'shangi, Háik, and Zuwái.† And apparently lake Zambéze or N'yassi is subject to the same law.

This survey of the physical character of the plateau of Eastern Africa cannot be concluded without special attention being directed to a most important practical result which it affords. It is, that the eastern coast of that continent presents facilities for the exploration of the interior very superior to those possessed by the western coast. For, when the narrow belt of low land along the shores of the Indian Ocean—which, from its general dryness arising from the absence of large rivers, is far from unhealthy at most seasons of the year—is once passed and the eastern edge of the elevated tableland is attained, a climate is met with, which is not merely congenial to European constitutions, but is absolutely more healthy than that of most countries. I speak from the experience of upwards of two years passed on the high land under circumstances anything but favourable. Here—that is to say, on the edge of the elevated plateau, and not in the low desert country along the sea-coast—settlers might take up their permanent residence, without apprehensions as to the effects of the climate at any period of the year; while travellers might wait in safety, and even with advantage to their health, till suitable opportunities should present themselves for penetrating westwards into the interior; and in the event of their having to retrace their steps, they would only return upon a healthy and delightful country, where they might remain till the proper season should arrive for their journey down to the coast. On the other hand, the climate of the western coast, even far inland, is notoriously such, that few can long withstand its baleful influences; while a traveller is necessitated to press forwards, whatever may be the time of the year, whatever the condition of the country, whatever even his state of health. And should he, from sickness or any other unforeseen circumstance, be compelled to abandon his journey, he must do so with the painful knowledge, that the further he retrogrades the more unhealthy are the dis-

* Vol. i. p. 72, sq.

† I. likewise Lake Abbale? See page 66.

tricts which he has to traverse, and the less likelihood there is of his ever reaching the coast, more fatal than all the rest.

[But while the eastern coast presents advantages of climate so much superior to those of the western coast, its physical conformation renders it impossible that it should possess any river of magnitude, which—as I fondly imagined might be the case with the Gódjeb, when I sent home from Shoa my first accounts of that river—"may be found to afford another high road into the interior of Africa."* In those instances in which rivers of this description have been supposed to exist, further information has demonstrated the futility of such suppositions. Thus, the pseudo-Kilimáne, or "Kilimanci," which was believed to enter the Indian Ocean near Melíndah, is shown to be a purely hypothetical river, having no real existence whatever;† while the Jubb or Gowín—the pseudo-Gódjeb or "Gochob"—instead of coming from the north-west, far in the interior of Africa, is now found to be nothing but the Wabbi-Giwéyna, and to have its sources on the easternmost edge of the Abessinian plateau.‡]

It would now only remain for us to follow the course of the Nile downwards along its left or western bank; but upon this subject, from the absolute dearth of information, there is in truth but little to say.

In a letter from M. Gauttier d'Arc to M. Jomard,§ it is stated, on the authority of M. Thibaut, that in lat. $7^{\circ} 43' N.$ the main stream, which at this point has its course from the E.S.E., receives three branches coming from the S.E., S.S.W., and S.W. These tributaries are said to be of no great importance, and to *appear* to proceed from the neighbouring marshes. In M. d'Arnaud's map they are represented merely by a small lake or pond (*étang*), and another is shown in about $7^{\circ} N.$ lat. They will, however, require to be more closely examined before it can be positively asserted that they are not streams of some, perhaps even considerable, length. Thence continuing to descend the river, we come at length, in lat. $9^{\circ} 20' N.$, to the great western arm noticed by M. d'Arnaud and his companions, to which they attribute the name of Bahr el Ghazál, supposing it to be the same as the Keíláh or Misselád. M. Jomard, in his 'Observations sur le Voyage au Darfour,' recently published,|| has entered into an elaborate disquisition on the subject of this branch of the Nile, which he considers to be one of great magnitude, and perhaps equal to the direct stream ascended by the Egyptian expeditions.¶ Should this

* See 'A Statement of Facts, &c.,' p. 7.

† See page 17, *note*.

‡ See page 46, *note*.

§ 'Bulletin,' 2nd Series, vol. xviii, p. 382.

|| (8vo. Paris, 1845), p. 26, *sqq.*

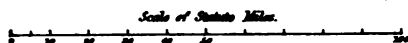
¶ M. Lafargue entered the mouth of this river, which he describes as a magnificent stream, with a tolerably rapid current. 'Bulletin,' 3rd Series, vol. iv. p. 160, *sq.*

prove to be the case (and indeed it would appear that *this yet unexplored river is Ptolemy's great western arm of the Nile*), a field for investigation is here opened, which is perhaps scarcely less extensive than that which has formed the subject of the present Essay.

My own personal explorations and researches having, however, been confined to the countries watered by the tributaries of the Nile on its right or eastern bank, I am not ashamed to avow that beyond that river westwards is to me almost a *terra incognita*. It is, therefore, a matter not less of prudence on my part to stay my inquiries here, than it is of justice to M. Jomard to acknowledge how much is due to the communications of so diligent an investigator of the course of the Nile.

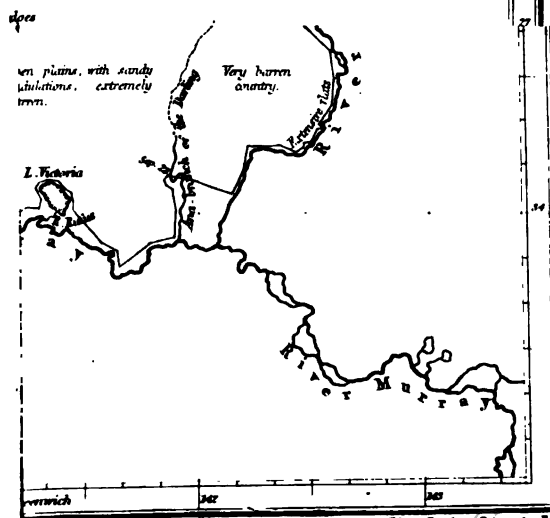
St. Mildred's Court,
28th October, 1846.

Map of the Country explored
by the
CENTRAL AUSTRALIAN EXPEDITION
under the command of
Captain Charles Sturt
during the Years 1844, 45 & 46.



Track of Capt. Sturt & M. Browne.
Track of M. Bole & M. Browne.
Dry track.

Cooper Creek is of great depth & contains permanent sheets of water its banks are well wooded & its neighbourhood grassy. It has from 500 to 400 inhabitants.



ART. II.—*A condensed Account of an Exploration in the Interior of Australia.* By Capt. CHARLES STURT, in 1844 and 1845. Extracted from his Journal and from Papers transmitted to the Right Honourable the Secretary of State for the Colonies, and by him communicated to the Royal Geographical Society.

[Read 8th and 22nd February, 1847.]

IN 1843 Capt. Sturt submitted to the Secretary of State for the Colonies a proposition for an extensive exploration of the Australian continent, from S. to N. and from E. to W., offering to organize and conduct the expedition. Her Majesty's Government acceded to the proposal, but under considerable modifications; and Governor Grey was authorized to propose to Capt. Sturt an expedition on a limited scale, towards defraying the expenses of which a sum of 2500*l.* was granted. Capt. Sturt assented; and being furnished with instructions by Governor Grey, forthwith proceeded to organize his party and make the necessary preparations for an undertaking requiring at once the most patient perseverance, the greatest fortitude, and the highest moral courage.

The party consisted of Capt. Sturt; Mr. Jas. Poole, assistant surveyor; Mr. John Browne, surgeon; Mr. John Stuart, draughtsman; and fourteen others.

On the 10th of August, 1844, the inhabitants of Adelaide gave a public breakfast to the members of the expedition, immediately after which the main body proceeded towards Gawler Town; Capt. Sturt, however, not quitting till noon of the 14th.

On the 21st, arrangements were made for the future duties of the several persons composing the expedition; the men were assembled, and it was stated what each would be more particularly expected to do, at the same time it was explained that every one would be required to render mutual assistance to his companions; that disputes and quarrelling would be discountenanced, and all intercourse with the natives, but more particularly the native women, was positively forbidden. On leaving Moorundi, Capt. Sturt adds, "I felt it a duty I owed both to myself and to my men, before they finally left the habitations of civilised man, to address a prayer to Almighty God for His protection and guidance. The men stood uncovered around me; and, having concluded it, I directed them to proceed on their journey; and in less than half an hour they had crossed the flat, and were to be seen pushing on slowly but regularly to the N."

Mr. Eyre, having obtained the Governor's permission, joined the expedition to accompany it up the Darling; and through his exertions two influential natives were added to the party. Mr.

Eyre's services to the expedition proved extremely valuable, from the influence he possessed over the natives.

Aug. 24th.—Capt. Sturt and Mr. Eyre quit Moorundi and proceed up the river.

26th.—The night exceedingly cold, and ice found in the pans in the morning. At 7 A.M. the thermometer stood at 32°, having been during the night at 28°. On gaining the upper levels the surface of the country was found undulating and sandy, with clumps of stunted cypresses and fusani scattered over it. Lat. 34° 4' 30".

28th.—"Rose higher ground at about a mile from where we had encamped. At this particular place the high fossil formation, through which the river has cleaved its way, terminates in numerous spurs, with abrupt stony gullies, instead of the bold and lofty cliffs which generally characterize the scenery of the Murray lower down. In passing along we just cleared the heads of these gullies, having a thick brush of *Eucalyptus dumosa* closing upon us to the left, the soil a soft yielding sand mixed with rounded fragments of limestone." The lake Bonney was reached on the 23th, and the following two or three days were occupied in surveying and chaining its boundaries. The weather continued cold, the barometer standing at 30.66 inches. Capt. Sturt observes on the extremely small number of natives hitherto met with, and attributes the decrease of the population to collisions with the overland parties. Lake Bonney lies E. by S. of a bend of the river in lat. 34° 10' S., being 2½ miles broad from E. to W. and 3¾ miles in length from N. to S., communicating with the Murray by a small tortuous creek named, by Capt. Sturt, Hawker Creek, by which it is annually filled; its shore is sandy, and it is confined by a bank of sand from 25 to 30 feet in height on all sides except the S. The country beyond the lake is a barren desert, consisting principally of cypress ridges and open salsolaceous plains.

Lunar observations obtained Sept. 3rd gave the long. 140° 26', lat. being 34° 12' S.

Quitting Lake Bonney, the route was through a barren low scrub for about 8 miles, till the Murray was again met with in lat. 34° 14', where they found an abundance of feed, the soil being of a richer description than generally occurs on the banks of that river. The expedition had to this point proceeded without the slightest disaster, the men contented and cheerful, the animals in excellent condition, and the sheep had travelled admirably. The arrangements of the camp were, that, on halting, the drays were drawn up so as to form three sides of a square, the tents constituting the fourth side; thus the camp became a place of defence, the men safe from surprise, the sheep folded within the square, and the dogs chained to the drays. At sunset a

guard consisting of three men was mounted, and remained on duty till sunrise.

Sept. 7th.—After crossing an extensive plain of polygonum, the party struck the Cawelli, the largest lagoon on the river. Many natives visited the camp—men, women, and children; and in the evening there was a corrobory. The place is about half a mile from the ground where the volunteers were discomfited, and about a mile from Fort O'Halloran, a neighbourhood celebrated for various tragical events.

10th.—Reached the Rufus, lat. $34^{\circ} 4'$, at the point from which Capt. Sturt proposed sending in advance to ascertain the state of the Ana branch of the Darling, discovered by Mr. Eyre on a recent expedition to the N.; being anxious, if possible, to run up this ancient channel, by which the journey to Williorara would be considerably shortened. Mr. Browne and Flood were accordingly dispatched to ascertain how far it would be possible to keep the banks of the Ana branch; and during their absence Mr. Poole was employed in surveying the lake and the Rufus, the latter connecting Lake Victoria with the Murray. It was at this spot that the natives attacked a party of Mr. Langhorne's, under the charge of Miller, and also Mr. Robinson's party, which latter would have been overpowered but for the timely arrival of a detachment of police sent from Adelaide.

12th.—Mr. Eyre quitted the expedition to return to Moorundi. The influence and authority acquired by that gentleman over the natives is described by Capt. Sturt as quite surprising, "an influence as creditable to himself as it has been beneficial to them: one and all hold him in the highest respect, and regard him truly as their benefactor." The banks of the Rufus, from its junction with the Murray to the lake, afforded most luxuriant feed for the cattle. Lake Victoria, like Lake Bonney, is a shallow basin, enclosed for the most part by barren sandhills, and surrounded by a desert country; it is, however, much larger than Lake Bonney, being about 25 miles in circumference.

13th.—The weather exceedingly cold, and the nights clear and frosty. The winter must be severely felt by the natives, who are without any means of defence against the cold, and many of them are prematurely cut off by pulmonary diseases. About twenty natives visited the camp, and they persisted in asserting that there is no water in the Ana branch, but that at Williorara (Laidley's Ponds) there is a lake larger than Lake Victoria, with abundance of grass around it. The thermometer, tested by boiling water, gave the height of the country on or below the level of the sea.

14th.—Mr. Browne returned to-day. He stated that he had come upon a salt lake about 800 yards in circumference, a third

of which was covered with water, and half the remainder encrusted with crystallized salt; there were also, about 2 miles beyond, two other similar lakes, but dry and without any deposit of salt in them. At about 5 miles from these lakes he struck the Ana branch of the Darling, marked where he came upon it by a line of gum-trees; its course N.W. by W., width about 80 yards, with a northerly current setting upwards from the Murray, caused by the back-floods of that river. At about 2 miles from its junction with the Murray it passed through a polygonum flat, in which it lost its character. The natives call the Darling "Yankee," the Murray "Runka," and the Ana branch "Parè."

22nd.—Reached the junction of the Ana branch with the Murray, and found an immense body of water rushing into it from the river. The country on its banks is miserably barren; in itself, however, it is broad, but its course tortuous and irregular. The whole aspect of the country is barren in the extreme; the magnificent gums of the Murray are no longer seen, and nothing but a stunted box (*Eucalyptus*) supplies their place. The weather exceedingly cold, the equinox having set in with the wind from the S.W. It is evident that the winters are dreadfully severe in this depressed region. Having, however, turned northward, the climate will soon be of a more genial character.

24th.—Crossed the Ana branch close to the head of the water. Here a large black snake 8 feet long sprang at Capt. Sturt, but was fortunately avoided; the men soon put the reptile *hors de combat*; but to the last he showed fight. Gained the Darling at sunset, after a journey of about 22 miles: it was all but dry, with no perceptible current, whilst its waters were opaque and muddy. Many of the flats equalled the richest scenery in England; but during the heat of summer the scene changes, and the very ground on which the grass at this season waves in luxuriant abundance, becomes herbless and bare. Being informed by Nadbuck, one of his guides, that a large encampment of natives was in the neighbourhood, Capt. Sturt adopted the precaution of doubling the guard, so that a sufficient number might always be prepared to resist any attack until the whole party were under arms.

27th.—The Darling hereabouts, lat. $33^{\circ} 43'$, is but a shallow stream. Its channel is still, like that of a canal; an abundance of grass is found upon its immediate banks, but the soil is almost pure sand. Notwithstanding the increased distance from the sea, the boiling-point of water does not indicate a level exceeding 100 feet above that of the ocean.

28th.—About noon a numerous tribe of natives, without women and children, was met with, assembled evidently for the purpose of hunting. For the first time rocks of ferruginous sandstone

were met with in the bed of the river, protruding from the sandy ridges bounding the alluvial flats.

29th.—The journey was resumed at 7 A.M., the course N.N.E., and a distance of 15 miles obtained. The flats of the Darling are superior to those of the Murray, having this peculiarity, that they are entirely free from reeds, and at this season of the year are covered with luxuriant vegetation for several miles. As the expedition advanced, the river became clear instead of muddy, and there was observed a greater rapidity of current, and quantities of bark and grass floating down, covering the surface of the water. The Darling was now rising rapidly, rolling its turbid waters along at the rate of $2\frac{1}{2}$ knots an hour. In one night it had changed from an obscure and lifeless stream to a broad and rapid river, having risen 3 feet above its previous level. Whence this flood came it is impossible to say. There has been much rain in these depressed regions, and it may therefore be concluded a good deal must have fallen on the hills; and it may be that from these the sudden rise has occurred. This rise may be periodical, and not accidental; but it continues, and the river is bringing down large trees and drift. The marks of flood on the trees near the river indicates a rise of 18 feet, which would cover the flats; but they have not the appearance of flooded lands. The line of the Darling does not appear capable of maintaining a numerous population.

30th.—The river last night rose more than 4 feet; and it is now a splendid stream, and looks well in the midst of the dense and drooping timber on its banks. The country, at a short distance from the river, is more open, and from some of the sandridges an extensive view may be obtained; no hills are, however, visible, although if the floods now pouring into the Darling come from the ranges behind Williorara, they must be both extensive and lofty. Course N.N.E.; distance gained during the day 9 miles.

Oct. 2nd.—The river continues to rise, and has made considerable encroachments on the lower levels; it must be discharging an immense body of water into the Murray. The river flats are becoming smaller, although still affording an abundance of feed for the cattle. A meridian altitude gave the lat. $33^{\circ} 14'$.

3rd.—The road this day was over rotten and flooded lands, on which the water had subsided, and whose surface the sun has caused to open and yawn in deep fissures. This ground was much worse for the bullocks than the heaviest sandhills, it being impossible for the drivers to avoid the holes; and the wheels, falling into them up to the very axle, shook the polers to pieces. These flats are an alluvial deposit, a strong, stiff, tenacious clay; a kind of bastard-box (*Eucalyptus*) grows upon their outskirts,

and the polygonum is scattered over their surface, which is sparingly covered with grass. "But few natives have appeared, and they are wholly inoffensive: one of these, however, managed to purloin and conceal our butcher's-steel whilst killing a sheep. The theft being discovered, a strict inquiry was commenced, and Nadbuck and Toonda, the natives who accompanied us, were told that, until the lost property was recovered, they would not be allowed any food. On hearing this, Toonda, after speaking to one of the blacks, went to the tree under which the sheep had been killed, and, scooping away with his foot a little dirt, discovered the steel. The thief appeared ashamed, and sneaked off, and the whole party soon left; neither did they follow the camp, owing, in all probability, to the detection of their peculation, and the firmness and resolution shown in recovering the stolen property." At noon a creek was struck, up which the floods were just commencing their progress: this creek, it was asserted by the natives, is the channel of communication between the Darling (Yankee) and Yertello Lake; the latter they stated to be at a considerable distance to the westward. The river continues to rise; the current is now tremendous, with a depth of 16 feet.

5th.—A meridian altitude gave the position in point of lat. $32^{\circ} 56'$.

7th.—The rise of the river continues at the rate of about 6 inches in the twenty-four hours. Most of the large lagoons passed were filled by the floods, as was the angle of the river at which Mr. Eyre turned back on his recent journey up the Darling. The natives are quiet and well disposed, and the influence of Mr. Eyre evidently extends to this part, and he merits unmeasured praise for his exertions amongst them. "To those exertions," says Capt. Sturt, "more than to our own prudence, must we ascribe the peaceful manner in which we have passed through the tribes. Up to this moment we have not seen a weapon or lost an article, the steel having been recovered. Many beautiful farms might be established on the banks of the Darling, for both its soil and climate are favourable to the growth of the hardier tropical productions as well as to the cereal crops; no blighting winds appear to prevail, and the rains continue much longer than in the neighbourhood of Adelaide."

9th.—"At noon this day our latitude placed us in $32^{\circ} 33'$, and we made somewhat more than 5 miles of northing, so that we are now in $32^{\circ} 28'$ lat., about 2 miles below Laidley's Ponds. About 2 p.m. Mr. Poole observed a low range of hills bearing N.W. by N. with two small cones. The reports of the natives of the Cis-Darling country is not very encouraging. They say that there is neither water nor grass beyond the hills, and that we shall all die if we persist in passing them. This is a

second edition merely of a former story, and I am neither disappointed nor discouraged by it." It had been stated by the guides that abundance of grass would be obtained at Laidley's Ponds; on arriving there it was found that the country was barren on both sides. The grassy flats of the Darling were succeeded by a bare, cold, white clay, which formed the banks of the creek, and extended to the base of the sandy ridges by which they had been approached. Instead of being a mountain stream it was nothing more than a channel of communication between the Darling and the lakes of Cawndilla and Minandichi: the current was rushing into it from the river with great violence, and it appeared to be filling rapidly. The native guides here became no longer serviceable, and Capt. Sturt was from henceforth to rely on his own unaided judgment: their reply to inquiries was, "The bullocks will hold their tongues out, the drays will be upset; you will all die, for there is neither water nor grass on the hills, or a stick to burn." Capt. Sturt adds, "We have now arrived at the borders of the desert which has foiled the most enterprising and the most undaunted of Australian explorers, and have now to try if we can penetrate its recesses. I can only say, that if I succeed in this great undertaking it will be from the guidance of that Good Being on whose aid and protection I have firmly relied."

11th.—Mr. Poole left this morning for the hills, accompanied by Mr. Stuart, taking a week's provisions. The following were a part of his instructions:—"In proceeding on your journey your main object will be to ascertain where there is sufficient water and feed for the animals for a week or ten days; and in the event of your succeeding in this, you will be good enough to return to the camp with the least possible delay, that no time may be lost in moving the party to it. Should you be of opinion that there is sufficient feed and water at the head of Cawndilla Lake, it will be better for you to return, as the advance of the party even so far will facilitate the examination of the hills, and will withdraw the party from the neighbourhood of the river. Should there not be a sufficiency of water and feed at the place mentioned by the natives, at the head of the Cawndilla Lake, you will proceed to the hills, and endeavour to ascertain if there is any valley or any grass at the base of the ranges, where the mountain torrents overflowing the plains cause the vegetation to be more abundant. It is not probable that you will be able to ascend the ranges with the horses, but it will be discretionary with you to adopt any plan you may consider most likely to ensure success on this occasion, and you will be at liberty to prolong your journey if you should anticipate any favourable result, and have provisions to do so prudently; and it will remain with you to act according to your own judgment during your absence, only bearing in mind that the

object of your journey is to find the means of enabling the party to advance, and that to effect this object every other consideration must be abandoned."

Amongst the natives of this part diseases of the eye were very prevalent, several having lost the sight of one; and Capt. Sturt considered them a short-lived people, from their want of protection against the vicissitudes of the seasons.

12th.—Mr. Browne started early with Nadbuck for Cawndilla, to examine the place where the natives state there is abundance of grass and water. On his return at night he reported that both were there, but a mile and a half apart; the former in a belt round the edge of the lake, the latter in the creek Williorara. Immediately opposite to where the party are stationed, on the other side of the Darling, about a mile from it, was Sir Thomas Mitchell's last camp. The dray-tracks and fire-places were still visible; from this point the ranges could not be seen, but only the low sandhills of the Cawndilla.

15th.—Mr. Poole returned about noon, after an absence of four days and a half: his report was by no means favourable.

17th.—The drays started for Cawndilla at 10 A.M. The country to the S. consists of open plains of red clay and sand, with but little vegetation; to the N. from the sand-ridges the eye scans a depressed region darkly covered with dwarf box and polygonum. The whole of the latter is flooded land, and constitutes the bed of Minandichi Lake, which, like Cawndilla, receives the backwaters of the Darling through the channel of Williorara. A portion of this flooded land was crossed by Mr. Poole on his late excursion to the hills, from the summit of which he perceived that it extended far away to the N., occupying nearly the whole space between the Darling and Scrope range. Cawndilla can never be more than 2 or $2\frac{1}{2}$ feet deep, and when full must have a larger surface than Lake Victoria; it presents an immense level to the eye, bounded partly by sandhills not exceeding 25 feet in height, and partly by a dark line of trees.

20th.—This morning Nadbuck made his appearance with two other natives from Lake Victoria bringing dispatches. The weather has become oppressively hot.

21st.—Capt. Sturt, accompanied by Mr. Browne, Flood, Morgan, and Topar, with the light cart, left the camp at 8 A.M., on an excursion to the distant ranges seen by Mr. Poole. At a quarter of a mile they crossed the sand-ridge which separates Cawndilla from Minandichi, and descending into the flats of the latter, entered on plains of great extent, partly covered with trees and brush: course 157° to the W. of S. Soil a red sandy clay, resembling that of the plains of Adelaide, both in its nature and its productions. The trees were generally low, comprising new

species of *Casuarina* and *Capparis*, a few *Hakeas*, and several very pretty and fragrant flowering shrubs. At about 12 miles, the course was changed from 157° to 135° W. of S., which was continued the remainder of the day. From the time of altering the course the ascent became gradual; and at 23 miles, the party having reached the ridge of a sandhill, immediately descended into and crossed the bed of a large dry creek coming from the ranges, and apparently passing into the almost interminable level to the W. Here were seen four beautiful hawks resembling sea-gulls. Topar showed the way to a native well at the foot of a gum-tree, about 4 miles higher up the creek, where the party rested. Into this well, covered with branches, the gravel had fallen, so that it became necessary to clear it out, and, after all, the supply of water proved insufficient.

22nd.—Having been assured by Topar that another and a better well would be met with about 4 miles higher up the creek, started at 5 A.M., taking the right bank, having an open barren country to the S. To the N. all appeared sterile, nor was there a sign of vegetation but in the bed of the creek, the course of which was marked by a line of gum-trees, as is the case with every watercourse in the interior. Arrived at the well, a plentiful supply of water was obtained, but it was bitter, from the gum-leaves, and when boiled became as black as ink.

23rd.—Capt. Sturt, having reason to be dissatisfied with Topar, and no longer reposing any confidence in him, determined on following his own route, regardless of his guide's remonstrances. Reaching the base of the ranges at 10 A.M., they ascended the summit, which was more level than had been anticipated, with some appearance of fertility; descending the range on the opposite side, and crossing the head of a creek in which there was a small pond of water, they began to mount the opposite range by a stony watercourse. From the summit of a hill commanding an extensive view nothing cheering could be seen either to the N. or N.W.; everything below was dark and dreary, nor could any indication be perceived of creek or watercourse. Water boiled at 210° . Returned to the creek at 6 P.M.

24th.—Proceeding up the creek, appearances improved; several large water-holes were passed, and there was found feed for the cattle sufficient for some time. The course of the creek was straight, and at 7 miles it entered the ranges, having hills on either side of it. Having passed the ranges, and gained their northern base, an extensive plain was discovered, Coonbaralba bearing $N. 45^{\circ} E.$ Leaving some detached hills on the left, the course became N. by E., and at 3 miles ascended a small isolated hill (which the men named Piesse's Nob) of very remarkable appearance, with large blocks of rock in a confused heap on its

summit, which were found to consist of magnetic ironstone. The needle being placed on one of these rocks to steady it, deviated 48° from the N. ; and it was only by raising the compass considerably that it could be made to act.

25th.—Having ascertained that a sufficiency of water and grass could be obtained for the supply of the camp, the party returned thitherwards, travelling during the day about 30 miles, under a temperature of above 100° Fahr.

26th.—A sudden squall of wind from the N.W. came on about daylight, carrying everything away before it : the weather became bitterly cold, and the return to the camp was severe and chilling ; the wind fairly blew through the clothes, and swept over the plains with a force and severity not to be described, so that the party were almost perished. The thermometer on the preceding Friday had been at 110° in the shade.

29th.—The horse-team having been yesterday sent in advance under Mr. Browne's superintendence, to prepare wells for the cattle, the party set forward early ; about noon a pit was dug, from which during the day 1300 gallons of water were drawn, the ordinary daily consumption being not less than from 1100 to 1200—an enormous quantity to supply in such a region. The hole was dug at the foot of a rock, and was only a spade deep, the water filtering through the gravel of which the rock is composed. The cattle did not suffer so much as the horses, but the dogs felt the heat most severely, and one sheep died from a coup-de-soleil.

30th.—Capt. Sturt, considering that it would be preferable to push on as rapidly as possible for the point at which he proposed stationing the camp, rather than to reach it by short stages, directed an early start this morning, and fortunately fell in with a pond of water, where, stopping to breakfast, the animals were rested, and about 5 P.M. reached the long water-hole. Here three natives were found, who stated that there was a well-inhabited country to the N.

Nov. 2nd.—Mr. Poole and Mr. Stuart went to the hills on the right of the creek, while Capt. Sturt and Mr. Browne rode up it to take bearings ; Mr. Browne, having been attacked with low fever, was compelled to return : following the creek into the plain, another beautiful pond of water was discovered, a circumstance which afforded much satisfaction, as ensuring the safety of the cattle. The weather oppressively hot and disagreeable, although the thermometer does not indicate a very high temperature ; the barometer lower than at any previous period, indicating, in any other climate than this, an approaching storm. The sky cloudless, and the wind from the N.E., and even cool, but the excessive lightness of the atmosphere acts upon the system as if it were oppressively hot.

4th.—Left the long water-hole and its dusty precincts this morning, and established the camp in a free open space in the midst of the hills.

5th.—An excursion to the N.W. having been determined on, Flood, Morgan, Lewis, and Sullivan were sent on with the horse-team at 9½ A.M. They were directed to deposit a tin box containing 80 gallons of water at 25 or 30 miles' distance, taking also with them 46 gallons in casks. Their course was to be 140 to the W. of S. until they were overtaken by Capt. Sturt and Mr. Browne, who followed in the light spring-cart. From the camp the plain was traversed for about 5 miles, when a slight ridge was crossed; at 2½ miles further a small stony range was passed, the principal range being about 2 miles in advance. Gaining the summit of a hill on foot, a full view was obtained of the impracticable nature of the country towards which they were moving; and as there was a watercourse at the foot of the hill, trending rather to the S. of W., which appeared to join a creek coming from an opening in the ranges, the party proceeded to trace it down, in preference to continuing the previous line of route. An elevated table-land appeared to have been gained, through which the hills protruded; it almost seemed as if all the ranges had at one time been of equal height, and that the valleys had been filled up to a certain level, now forming a plain proportionably higher than the plains crossed in approaching the ranges.

6th.—Sullivan and Lewis returned to the camp this morning. Capt. Sturt and Mr. Browne proceeding to the summit of a hill of considerable height (Lewis Hill), about 3½ miles from the halting-place of the preceding night. From this point a very extensive view was obtained, and the character of the country more accurately ascertained. It became obvious that it was an elevated table-land, traversed by numerous rocky ridges, seldom or ever exceeding 600 feet in height from the level of the plains at their base. Not one single cheering feature displayed itself. Barren as the country was, there was much grass upon this hill, with kangaroo-grass in the watercourses. Rejoining Flood with the cart, the course was N.N.W., when a thick scrub of the *Eucalyptus dumosa*, on the summit of a range backing the one last crossed, presented itself; breaking through this, an effectual barrier of steep dark gullies and ravines stopped all further progress in that direction. The hill-formation had undergone a complete change; basaltic rocks, passing into slate, presented themselves on all sides. A small bright pool under a rock, which was deepened and enlarged, afforded the clearest and purest water met with for some time.

7th.—Quitting the rocky water-hole about 8 A.M., and pursuing the course of the creek, several water-holes were found; but the

bed of the creek had become so rocky as greatly to obstruct the advance. The valley or glen expanded for a short distance, but again contracted, and the steep rugged sides of the hills closed nearer and nearer. At one spot, where there was a native well, the remains of a large encampment of natives was discovered. About 2 miles from this last sleeping-place, the rock-formation turned to a coarse granite, traversed by veins of quartz; large slabs of it stretched across the creek, and immense fragments impeded their progress. At length, from the numerous boulders, it became impossible to lead even a horse any further. Flood ascended one of the hills to discover, if possible, any leading ridge by which the route might be pursued, but the line of hills ran across the course; he however thought, from what he could see, that there was a finer country beyond the hills, and he stated that there was a lofty hill about 3 miles to the eastward, from which the country might be more accurately surveyed. Leaving the horses, Capt. Sturt and Mr. Browne started on foot for this hill, the summit of which was gained in $1\frac{1}{2}$ hour; nothing satisfactory was discovered, although the view to the N.W. was very extensive. Nothing could exceed the barrenness of the ranges, which extended nearly N. and S., forming a dark line, and bounding the level country below them as with a steep wall. The nearer plains were open, and appeared to have some little nutritious herbage upon them; but the exact character of the vegetation could not be ascertained. Beyond the plains, an unbroken line of scrub extended to the horizon, as dark and gloomy a prospect as man ever looked on; the forests in nowise resembling those of England, diversified by a variety of hues, but presenting a single shade of brown, while a stillness the most profound reigns through these dreary deserts. A large hill bore 7° to the E. of N., and observations gave the position $31^{\circ} 32'$; boiling-point $210^{\circ} 25'$.

8th.—Mr. Browne and Flood started at 7 A.M. for the purpose of endeavouring to discover some practicable descent into the plain; they fortunately hit upon apparently the only available spur, and on reaching the plains turned northerly, along the base of the ranges, until they struck the creek, in which there was an abundant supply of water and grass. The aspect of the plains was better than had been anticipated, and some low hills were observed to the N.N.W.

9th.—Early this morning the party proceeded by the descent discovered yesterday by Mr. Browne, and with care the cart was safely got down to the plains. On looking back at the dark mass of ranges, they were seen to extend as far as the eye could reach in a N.N.W. and S.S.E. direction, forming semicircles like bays, and having all the appearance of a coast-line. The course was now half a point to the E. of N. Some prickly acacias in full

blossom, a tree resembling a *Banksia*, and a new *Polygonum* were found on the western slope of the ranges.

10th.—Started at early dawn, observations showing the position to be $31^{\circ} 23'$. Finding that the creek (named by Capt. Sturt, Campbell Creek) turned too much to the westward, crossed it, and struck across for the hills to the N.N.W., nearly parallel to the ranges. For a few miles the travelling was good and firm, over sandy plains mixed with clay; at length the ground became covered with pebbles of quartz, ironstone, whinstone, and granite; it appeared as if McAdam had thrown there every cart-load of stones he had ever filled, so much did the surface of the ground resemble a newly metalled road. A line of undulating hills to the left, composed of ironstone, shut out all view of the N.W. horizon. At 4 P.M. some gum-trees were observed, indicating the course of a creek (Morphett Creek); on nearing them, some cockatoos were seen, and also the tracks of an emu. Arriving at the creek, there were appearances of water at no great depth; and on scraping off some of the surface-gravel the ground was found so moist that digging was commenced in right earnest, and shortly a good hole of water was obtained, from which the exhausted animals were freely supplied. The gravelly and sandy bed of this creek proves that it comes from ranges of the same formation as those lately crossed. It issues from a large semicircular opening in the hills resembling a bay, the range itself having the appearance of a coast-line, with all its indentations and projections. Boiling point 211° . Hitherto the course had been N.N.W., but for the last two days clouds, such as hang over large waters, were observed in the N.W., in the direction of Lake Torrens, and the course was accordingly changed to that point.

12th.—The country now began to improve; the soil was still red clay and sand, but some very fine flats intervened between the ridges, and water alone was wanting to make the place habitable. Both ridge and flat were covered with grass; box-trees (*Eucalypti*) were scattered over the flats, and on the ridges the *Hakea* grew an ornamental tree. These favourable appearances were but of short continuance; the cypress ranges became closer and heavier than before, and the flats again presented salsolaceous productions only. At noon the horses were fagged and overpowered with heat, and as any further advance would have been injudicious, Capt. Sturt commenced retracing his steps; but in order that every possible knowledge of the country might be obtained, Mr. Browne and Flood were directed to advance some 15 or 20 miles, and to rejoin the party at the muddy water-hole.

13th.—Morgan killed an emu, which, however, kicked the butt of a carbine to pieces with a single blow. The weather proved terrifically hot, and Mr. Browne and Flood rejoined at 5 P.M.

On leaving yesterday they kept N.W. for about 10 miles, and from an elevation they judged they could see 10 miles further. At 4 miles from the point from which they started, the sand-ridges all but terminated, and an open grassy country succeeded, extending as far as the eye could reach. The soil was the same, but there was more of vegetable decay on the surface, the herbage was green and abundant, and they passed several flats upon which there appeared to have been water but a few days before. The remains of four native fires were found at regular intervals, as if leading to some place; further N. ridges trending to the N.W. were seen. The results of this excursion were on the whole satisfactory, it being clear that the same barren country upon which Mount Serle looks down does not exist here, and it is also manifest that the sole impediment to travelling is the want of water. "We are now 150 miles to the westward of the Darling, on the N. side of the ranges which lie between it and Lake Torrens, and, if the hills continue, we may advance with a light party to an equal distance into the interior, with the certainty of finding water at their base. We have discovered two large creeks, with a supply of water in them sufficient to give us time to examine the country well, and to bring the whole party over the ranges."

14th.—Blowing a hot wind, the thermometer at 108° in the shade; the heat intolerable, and the flies absolutely unbearable.

17th.—A heavy thunder-storm with rain occurred yesterday; dense clouds came from the N.W., and the sky was generally overcast. "Reached the tents at 5 P.M., having ridden about 47 miles. Found Mr. Poole better in health, and learnt that affairs had proceeded favourably during our absence. Some natives had visited the camp, who intimated by signs to Mr. Poole that there was plenty of water to the W. and N.W. They did not remain, but proceeded to Cawndilla to fish, so that it would appear that the present rise in the Darling is periodical, and that the natives are collecting from all quarters on the creeks and lagoons."

19th.—The weather does not appear to have taken up, for although it has not rained during the day, the wind is high and cold, blowing from the S.E., the opposite point from that at which the rain commenced."

20th.—At noon Mr. Poole, accompanied by Mr. Browne and Morgan, with a pack-horse and a fortnight's provisions, quitted the camp on an expedition. The following formed a portion of Mr. Poole's instructions:—"It appearing more than probable, from the observations made on the recent excursion from which Mr. Browne and I are just returned, that if we could have secured a supply of water to have enabled us to get onwards for a day or two longer, we should have arrived at the brink of some extensive inland waters; and the late rains holding out every

encouragement for us to make a second attempt to reach it, I consider it desirable that you should proceed into the interior, so soon as the plains shall be dry enough to admit of your doing so, with a view to ascertaining whether the conclusion at which myself and Mr. Browne have arrived is correct or not. You will be good enough to take a N.W. course, as the one which I think most likely to lead you to a decisive point; but should any fresh feature in the country, of which I am not aware, show itself to you, and you should be of opinion that, by deviating from the course I have laid down for you to pursue, you will be furthering the object of the expedition, you will use your own discretion.

"Should you arrive at an inland sea, or a body of water the extent of which you cannot ascertain, you will take advantage of any neighbouring eminence to obtain the fullest view of it for my future guidance, and you will proceed to its shores to ascertain whether its waters be saline or fresh. Should the supply of water which I hope the late rains will have secured to you fail, or should you find that the rain has not extended so far to the N.W. as to enable you to go to a distance such as will be conclusive on the points to which I have drawn your attention, you will use your own discretion either to return to the camp or to make for the ranges, and return along their flanks. In the latter case, you will examine any creek or watercourse on which you may fall, in order to ascertain whether there is a sufficiency of water and feed to enable me to move the party higher up to the N., the object of the present expedition being to avail ourselves of the late rains to push into the interior as far as possible, that, by ascertaining its nature and character, we may regulate our future proceedings. Having every confidence both in your discretion and judgment, I leave much to yourself, and I authorize you to deviate from these instructions where you may feel it necessary, and consider that you have reasonable grounds for so doing," &c.

21st.—Mr. Poole had not been more than 2 hours on his journey before it began to rain, and this continued without intermission the remainder of the day and night. This morning the creek was up, and had a broad sheet of water in it, and every water-hole was filled to the brim. The ground was now in such a state that the drays could not be drawn over it, and the advance of the camp was necessarily deferred.

22nd.—A strong wind has surprisingly dried the surface most rapidly, so as to enable an advance. Whilst the men were yoking the oxen, Capt. Sturt rode to the ironstone range, the summit of which he found was crowned with large rocks; the N. point of the compass deviated 45° to the eastward from its proper bearing. The drays made but slight progress, in consequence of the heavy draught. The route was on the left bank of the creek. Although

there had, within a few days, been so much water in the creek, and rain had since fallen so abundantly, there was not now a water-hole in its bed, the thirsty soil had drunk the whole, nor could more than a scanty supply be obtained by digging. Boiling-point 210° .

25th.—Continued the journey up the creek, the ground being still too soft on the plains. Ascended Lewis Hill to survey the country. The range dividing the eastern and western waters shoots its lateral branches into the broad table-land on which the party were now advancing. Boiling-point on Lewis Hill 210° ; on the flat-topped hill (Mount Robe) 209° . An abundance of grass was found in all the valleys, and the general aspect of the country was cheering and picturesque; from its large proportion of waste and unproductive lands, it must, however, be deemed a barren wilderness; nevertheless, it would support a population sufficient to form a connecting link between the province and any better country to the N. At this season there is an abundance of spear-grass both on the hills and plains; there is also much clay, the decomposition of the ranges mixed with the land, but no vegetable deposit. The timber is stunted and useless, and the other productions of the plain are mostly salsolaceous. The beds of the creeks are entirely of gravel and sand, washed clean by the force of the winter torrents. So dreadful was the annoyance from the flies, that they absolutely hindered the occupations of the whole party.

27th.—In consequence of the pole of one of the drays snapping, all progress was retarded yesterday; this day descended into the plains at 1 P.M., and reached the first creek at 6. The bullocks suffered from the extreme heat; the sheep refused to stir, and the dogs collected under the shade of some trees.

28th.—Flood, Sullivan, and Joseph were sent to the second creek (Morphett Creek) to make a pond for the cattle, and to dig a well. A day of intolerable heat: the thermometer in the shade at 2 P.M. stood at 113° , and at sunset at 100° .

29th.—Quitted the first creek (Campbell Creek) for the second at 4 A.M., the distance being more than 25 miles; the course was N. by W., at about 4 miles from the ranges; re-established the camp at a distance of about 80 miles from the last camp. In the evening the wind commenced blowing heavily from the S.S.E., and the weather became extremely cold, the temperature having undergone one of those singular changes to which this region is subject, when the mercurial column ascends or descends 50° in an hour.

Dec. 2nd.—Flood was dispatched early this morning along the base of the ranges, to see if he could find water to enable the camp to move northwards. "Slowly as we may appear to travel,

neither horses nor bullocks could have done more under such a temperature; and it is only by fostering their strength that it is possible to push them hard when occasion requires; the greatest precaution also is necessary in such a country as this; and had Flood not found water in the small creek, a retreat would have been unavoidable. Our present position is full 200 miles to the westward of Fort Bourke, and about 30 S. of Mount Serle, with every thing to hope for in front, and nothing to apprehend in our rear." Flood returned in the evening, having found water for temporary purposes only; he thinks, however, that there are several large creeks more to the N. While riding out to-day, Capt. Sturt came upon heaps of rounded stones, with large boulders amongst them: the whole surface bore the appearance of a sea bottom: immediately under the hills to the westward there was a line of sandhills. One peculiarity marks the deposit of stones on the main ranges and on the plains, namely, instead of being mixed promiscuously together, the fragments of each rock occupy distinct patches,—the quartz one, the whin another, the ironstone another, chequering the ground like a chess-board; and it would almost appear as if immense blocks of each rock had been brought to these places, and there shivered to atoms. Mr. Poole and Mr. Browne returned to the camp. During their absence they had struck Lake Torrens, and it would appear that the water is not so salt at this end of the lake as at the broad part to which Mr. Eyre descended; it may be, therefore, that there is a great body of water to the N.W., of which Lake Torrens is the estuary. The appearance of the country was one sandy desert, undulating, but so uniform in colour, that it would be impossible for any one looking down upon it to observe its inequalities.

3rd.—Flood succeeded in striking a very fine creek with abundance of water in it, and at no great distance from the camp.

5th.—Flood and Mack, having been sent on the 4th to search for water, returned this afternoon, having found a large creek coming from the ranges, with an abundant supply of water, and feed in the adjoining acacia scrub. It is not, he reports, more than 40 miles in advance. He saw three native women, the first met with in this dreary region, but he did not approach them.

8th.—A thunder-storm in the morning, but the clouds and the rain hung to the ranges.

9th.—Moved this morning at 7 A.M. on a course somewhat to the E. of N. over the barren, stony, and undulating plains. Made about 22 miles, and halted for the night on the banks of a small creek.

10th.—Reached the creek (named Flood Creek), and found it very superior to any hitherto discovered. "Here we may remain

for months without any fear of a deficiency of water, should the northern interior be found impenetrable at this season of the year."

11th.—Mr. Poole and Mr. Browne, with Mack, started this morning, having a fortnight's provisions, with general instructions to traverse the country to the N.E. Flood was also sent along the base of the ranges. Capt. Sturt proposed himself going to the eastward of them, to ascertain from what sources all the surrounding creeks are supplied. Capt. Sturt observes, "We are gradually but firmly making our way into the interior, and, with the blessing of Providence, shall, I trust, raise the veil which has so long obscured it. Up to this period we have had nothing to disturb the tranquillity of our proceedings. No natives have been near to embarrass us, nor have we as yet felt the want of either water or feed. Yet I am sensible that this prosperous state of things may change, and I feel that any hasty or imprudent step would cripple my means or exhaust my forces. It is marvellous to me that this part of the interior is not inhabited; for, although it be a desert to civilized man, it must be very different to the savage, for here there is abundance of food for them; birds building in the most exposed situations, emus on the plains, and the bark of the trees rough with the tracks of the opossums. Where, then, are its inhabitants? Are they gone to a better country, or does the stony and burning nature of the ground drive them from their haunts at this season of the year? Another peculiarity marks this distant region; all vegetation still looks green and fresh, and the grasses which have long since shed their seed in Adelaide are not yet ripe here. Amongst them is a rye-grass that will, I have reason to think, be valuable; there is an indigenous wheat, which, by cultivation, may turn out well, although the seed is small; and there is a fine oat. This might therefore with propriety be termed the Cereal Creek, to mark the character of its vegetation."

12th.—About ten last night a most tremendous squall came on, which in a moment levelled every tent in the camp, and bent the trees to the earth.

A small party of natives came to the camp, but they manifested great alarm, and remained but a short time, although every kindness was shown to them; they were miserable looking creatures, possessing neither the elasticity nor the firmness of the savage.

13th.—Wishing to ascertain the nature of the country to the eastward, Capt. Sturt left the camp with Mr. Stuart and Flood, pursuing a course to the hills somewhat to the S. of E. From one of the highest of these, three detached ranges of hills were seen to the eastward, at a distance of at least 40 miles, an immense

plain intervening, dark with brush at its further extremity. Descending from the hills, the party advanced about 8 miles, halting for the night without water.

14th.—The wind blew so keenly that the party were glad to keep on their great-coats. Crossed level plains with much grass for the first 14 miles, traversing the beds of several dry lagoons and hollows. Appearances clearly demonstrated that the whole of this part of the country is under water in the winter season. Entered a dense brush of cypresses, acaciæ, and hakeæ for 16 miles. The temperature changed, and the atmosphere became oppressively close. Arrived at a naked sandy mound, a view was obtained of the hills towards which they were advancing, on reaching which the view became most discouraging; not a spot of green was to be seen, and the hopelessness of obtaining water, of which they had been deprived during the preceding 28 hours, induced a return to the camp. Turning, therefore, to the westward, after a progress of 8 miles, encamped for the night.

16th.—The morning-star had scarcely risen when the party mounted, anxious to get the horses to water. Crossing the plains, struck a creek at 8 A.M., running up which, in about a mile a small pond of muddy water was discovered; by boiling, this became clear, and supplied the wants of the party. Returned to the camp by a N.W. course, thereby avoiding the hills.

17th.—This is the country of winds and whirlwinds; it always blows hard, let the wind come from whichever point of the compass it may.

18th.—Flood brought in part of a cucumber-vine which he picked up on the creek; he stated that there were several fruit on the stem. There are a number of night-birds here, which make the most uncouth noises during the night, but fly about during the day like common birds.

19th.—Capt. Sturt with Mr. Stuart and Flood went down the creek to examine it: thermometer at the camp 110° . The creek continued for 9 miles, when it was lost in the pine-scrub. This afternoon a comet was observed a little to the S. of W. It was small and dim, with its tail inclined to the W.

21st.—A day of extreme heat; the thermometer 113° in the shade, with a hot wind from the W. The men generally complain of disordered bowels and sore eyes. Seeds are fast ripening, but it is extremely difficult to secure them; the seed-pods ripen in a day, and a single blast opens them all.

25th.—This afternoon Mr. Poole and Mr. Browne returned; they had reached to within 5 miles of the 28th parallel, and had not only found water, but had ascertained that the ranges continue to the N. They came back in good spirits, but their horses had not a leg to stand on, having been amongst broken stony ridges,

where they had lost their shoes; added to which, the weather was exceedingly hot, and they had had no water the last day. Mack, who went with them, lost 14 lbs. in weight. The following is a condensation of Mr. Poole's report:—"Left the camp on the morning of the 11th, followed a N. course for 3 miles, but, seeing that it would lead into an acacia scrub, changed it to N.N.E., and at 12 miles found a small pool of water, at which the party encamped, having travelled 15 miles over a barren stony country. On the 12th, started at 6 A.M.; at 2 miles saw distant ranges, and at 3 entered the acacia scrub. At 15 miles crossed a creek, the course of which was to the S.W., with box-trees and polygonums, but no water. At 6 miles from the hills, saw several places where the natives had been preparing acacia-seeds for food, the pods having been threshed out. At 5 P.M. reached the hills, the acacia scrub extending to within half a mile of their base. Found no water, and encamped in a gully. Ascended a hill, and from it saw gum-trees in a plain N.W., affording hopes of finding water in the morning. 13th. Left the gully at sunrise and made for the gum-trees, struck a creek with no water in it, but observed numerous flights of pigeons, all going to the N.W. Followed the course of the creek, and at 2 miles found a place where the natives had been digging for water; scraped a well which afforded a sufficient supply. After breakfast moved to a second creek, and at 2 miles encamped, on account of the horses being jaded. 14th. Took bearings, being in lat. $30^{\circ} 10'$. At 6 A.M. left the camp for a hill, which Mr. Poole named the "Magnetic Hill" (Mount Arrowsmith) from its turning the needle from the N. to within 3° of the S. point. Saw several hills to the N. and N.N.E. Descended and steered for a table-range, which was reached about 2 P.M. Followed down the creek to the eastward for 10 miles; found water and encamped, having travelled 35 miles. The country consisted of open plains, covered with rounded stones and quartz. 15th. Changed the course to N.E. through the scrub for 3 miles. The creek we were now on joined another with gum-trees in it, and at a short distance up this creek found a large supply of permanent water, at which we stopped for the night. Mack went up the creek, and reported that there were several large ponds of water. The appearance of the country barren, the plains stony, the hills of volcanic formation, with gypsum. Lat. observed, $29^{\circ} 47' 35''$ S. 16th. Followed up the creek, and found from 15 to 20 large holes of water. The horses were now beginning to suffer in their feet from the stony nature of the ground, their shoes being worn through the centre. The rock formation changed to porphyry. Distance travelled about 23 miles. 17th. Followed the creek for 5 miles, changed the

course to N. for some distant hills; the creek turned to the E.; at 20 miles struck a creek with large water-holes in it; this creek differs from those previously met with, its waters being muddy, and little or no grass in it. At 10 miles further struck another creek, where we encamped for the night. In consequence of the stony surface travelled over, the horses lost their shoes, and were becoming lame; the hills still distant about 12 miles. Resolved after ascending these hills to return home. 18th. Leaving Mack in charge of the horses, ascended the range between 9 and 10; saw ranges to the N. and N.E. From this point the range appeared to trend to the N.E., the scrub following the line of the range as far as the eye could reach. Took bearings and returned to the camp. Followed down the creek to its junction with the main creek in a N.E. direction; followed the main creek for 5 miles; the banks low, the flats similar to those of the Darling. The natives here appeared to be numerous, 27 fires being found at one encampment. 19th. Followed the banks of the creek E.S.E.; the day exceedingly hot, the birds overhead gasping. Found a muddy hole of water, at which we encamped for the night, having travelled 25 miles. 20th. Continued along the bed of the creek through the ranges, but found no water; from the summit of a small hill traced its course to the N.E. for some miles. Left the creek on a course S. by W. At 14 miles changed to S.E., and at 2 miles struck a creek, and found some water at 18 inches by digging. 21st. Followed this creek for 2 miles, left it for one of its branches in a S.W. course, then proceeded S.W. for the White Hill range, which was ascended to take bearings. At 6 miles struck the main creek: course N.E. and S.W. 22nd. Changed the course to the S. of W., struck the main creek and followed it for some distance; found abundance of water, and encamped. As the animals required rest, travelled 15 miles only. 23rd. Followed a S.E. by S. course over open plains covered with stones, the magnetic hill being to the S.W.; encamped on a small creek about 8 miles E. of this hill. Distance travelled, 35 miles. 24th. At 8 miles struck the first encampment; at 3 P.M. entered an acacia scrub; course S.W.; at 6 miles encamped; no water for the horses. On the 25th started at 5 A.M., and reached the camp at 4 P.M."

Mr. Poole returned with sore eyes, and was otherwise indisposed. From the above account it was evident that the camp might be moved 80 miles higher to the N. without any fear of the supply of water failing.

28th.—This day the tents were struck and the party resumed their journey. While Mr. Poole led the way, Capt. Sturt with Mr. Browne and Mr. Stuart ascended a lofty hill to the eastward to take bearings; they were now on the highest point of the last

of the ranges of the chain, and yet were in the very centre of barrenness. At 8 P.M. halted until the moon should rise, having travelled about 12 miles. At a quarter to 10 again advanced on a N. course. At daylight Mr. Poole caught sight of the hills, but in the obscurity of the early morn he had taken bearings of the wrong hill, and they got insensibly deeper and deeper into the pine ridges. Hoping that it was only a narrow belt, they pushed on, but the exertion was too great in that heated and inhospitable desert. In vain did the drivers force the bullocks over one sand-hill after another, they were like the successive waves of a stormy sea. Mr. Poole was sent on to water with the horses and sheep, Capt. Sturt and Mr. Browne remaining with the teams. Shortly after arrived at a salt lagoon, on the other side of which were the sheep, unable to move further. Here it was determined to leave two of the drays, in the hope that, by putting two of the teams in one, some progress might be made, but even then it was very slow. Mr. Poole's track leading deeper into the forest, Mr. Browne was sent to the eastward to ascertain its extent in that direction, and it appearing to terminate at $\frac{1}{4}$ of a mile, the course was changed thitherwards. The bullocks were completely exhausted; they were therefore unyoked, and, leaving all the men but Mack with the drays, Capt. Sturt drove them on to water. Guided by Mr. Browne, they cleared the sandhills at dark. At the end of the brush one of the bullocks fell, and at about 3 miles from the creek a second dropped. Having reached a water-hole, the remaining bullocks obtained relief, and Capt. Sturt and Mr. Browne rest, having been on horseback 36 consecutive hours. The westerly course had caused all these difficulties, but, adds Capt. Sturt, "I am not surprised at Mr. Poole's being deceived by the appearance of the hill, for in those dense brushes he was unable to get a second bearing."

30th.—Water was sent to the nearest bullock, but he was already dead; the sheep all arrived safely at 11. "It is remarkable that, notwithstanding the extreme heat of the days, the nights are exceedingly cold, insomuch that we are compelled to put on heavy coats. We last night gradually crept into the fires, and to-day the thermometer stands at 106° in the shade. Mr. Poole and Mr. Browne are both complaining of illness, and some of the men are suffering from inflammation of the eyes."

1845, Jan. 2nd.—The three drays reached the creek at 3 A.M., both men and animals worn out with fatigue. At daylight they proceeded to the well which had been dug, and by 9 they were much recovered. The men stated that the heat had been so intense that, when they stopped, the poor animals pawed the ground away from the surface to get at a cooler bottom. Mack's boots were so burnt that they cracked, and Lewis, who foolishly exposed his back to the sun, got severely punished. The dogs

lost all the skin off the soles of their feet, and could hardly crawl: one of them, indeed, fell in the rear and must have inevitably perished.

3rd.—The sheep have turned out a most valuable stock, and are so exceedingly quiet as to give no trouble; their fleeces are as white as snow, and they are in excellent condition.

6th.—The heat is so great that, notwithstanding the wheels of the drays were lately put in order, the tires have expanded so much as to render it necessary to wedge them before moving on. The men are complaining, and the water is so bad that serious consequences are to be apprehended from remaining here even a day or two longer. There has been little change of weather for the last month; the wind blows from the S.E. in the morning, but follows the course of the sun; towards noon it rises, and at sunset moderates.

7th.—The drays being ready, the party would have moved, but so terrible was the heat that it was impossible to stir before 5 P.M. Up to that time the iron bows of the bullocks were so hot that they would have burnt the animals' necks. Reached the creek at 10, keeping the bullocks yoked that there might be no delay in the morning. Near the water-hole just left there were some native huts of a very superior kind; instead of the usual flimsy habitation of boughs, these huts were arched over with strong limbs of trees, on which a thick thatch of grass was laid, and over this a quantity of soil, so as to render the habitation both air-tight and water-proof. The entrances were of an elliptic shape; each hut had a smaller one attached to it, in which probably they deposit their nets and stores.

8th.—Starting at 5 A.M., the journey was concluded an hour before noon, thus avoiding the extreme heat of the day. On arriving at the creek, the fires of some natives were found still burning. As soon as the camp is established, Capt. Sturt will himself proceed to the N., having ordered Flood to start to-morrow to seek a good line of road. The fall of the creeks hereabouts is to the eastward, but, however promising their appearance may be, they all terminate on the plains, either by spreading over them, or else filling some shallow basin, which for a time assumes the character of a lake or a lagoon, but is soon dried up by summer heats.

10th.—Flood having succeeded in finding tolerable ground to move over, left their position for the main creek, crossed by Mr. Poole in his recent excursion, in which he considers there to be a permanent supply of water. Traversed open stony plains of a barren nature, and crossed a fine creek at about 8 miles, the fall of the waters being to the eastward. Mr. Browne and Mr. Poole were both now tolerably well, but this season would try a

constitution of iron. The same burning weather continues, before which everything is giving way. Mr. Browne found a bottle of citric acid melted in his box, and his boots and shoes sticking together. The thermometer ranges from 90° in the morning to 108° at 3 P.M., and 97° at sunset.

11th.—Started at 4 A.M., and, pushing through the brush, debouched on open plains, generally covered with fragments of quartz; nevertheless they had more grass on them than those traversed yesterday. Keeping a little to the right, to avoid the gullies connected with some low ranges, reached the creek at noon, pitched the tents by a large water-hole, and found abundance of feed in and near the creek.

12th.—Wind N.W. The thermometer at noon stood at 108° in the shade. The mountain structure of the country has completely changed, the ranges are no longer continuous, but rise in unconnected groups, and they have also decreased in elevation; the rock formation is indurated sandstone, traversed by veins of quartz or shale, but, notwithstanding that, the hills are fast disappearing; the country is well watered, and the creeks are numerous.

14th.—Capt. Sturt, with Mr. Poole and Mr. Browne, Flood, Joseph, and Mack, left the camp at 1 P.M., following the general course of the creek. Mr. Poole and Mr. Browne had been down this creek, and had found more than 20 large water-holes in it. "We passed one at about 3 miles from the camp, and shortly afterwards a considerable creek junction from the westward. After passing this water-hole we looked in vain for another; the whole channel of the creek was as dry as if no water had been in it for months. I was not myself surprised at the rapid disappearance of the water, although my companions were, for I saw that it had been exposed to the double effects of evaporation under an almost vertical sun and absorption in a gravelly bed. They had not, like myself, seen rivers and lakes dry up before them, or they would not be surprised at what they now saw. Mr. Poole assured me that he and Mr. Browne crossed the creek junction higher to the westward, and that he felt confident there was a permanent supply of water in it."

15th.—Left the Red Hill Creek at 5 A.M. on a due N. course for a remoter creek, arrived there about noon, and found an abundant supply of water, the bed being of a stiff clay. The general course of this creek was E. and W. Traversed barren, stony, and treeless plains for 12 or 14 miles; on the right there was a low range consisting almost entirely of small peaks, to the left low hills connected with Red Hill (Mount Poole), and in front some undulating ground connected with the ranges towards which they were advancing. The precincts of this creek were bare of vege-

tation, and resembled the polygonum flats of the Darling. Lat. $29^{\circ} 14'$.

24th.—After exploring a considerable extent of country in various directions, Capt. Sturt returned to the camp, where everything was found to have gone on favourably during his absence, and where some degree of comfort was experienced after the exposure to a degree of heat perfectly astounding. On the 21st the weather was terrifically hot, the horses dripped with perspiration, the thermometer rising to 118° in the shade, but in the bush it had been at 132° in the shade and 155° in the sun. "It is now very evident that the ranges have altogether ceased to the N. and N.W., nor is it likely from appearances that they continue much further to the N.E. We have then the level and almost boundless interior before us, without a landmark of any kind to guide us, but for the present we are locked up as firmly as if girt round by ice at the north pole, it being impossible to move to any distance in consequence of the dry state of the country."

27th.—"The creek crossed about 4 miles to the N. of our camp was called by Mr. Poole the 'Rocky Creek' (Preservation Creek), and was found by him to contain an abundant supply of water in its bed; broke up the camp and advanced thither, fixing our position about a quarter of a mile from a romantic rocky glen of slate, in which there was an ample supply of water for 12 months to come. If unable to advance, we can here hold our ground, and occupy a most commanding position, so as to be ready to push into the interior at a moment's notice."

29th.—Mr. Browne had a serious attack of illness, and for some hours this morning was in excruciating pain; he is much relieved, but remains weak and exhausted. Mr. Poole left for Mount Poole to take an altitude. The barometer ranges from $29^{\circ} 90'$ to $29^{\circ} 70'$. The thermometer 101° at 8 A.M., 108° at 3 P.M. The men generally complaining of rheumatism."

Feb. 4th.—Being exceedingly anxious to get one of the natives to the camp, Capt. Sturt, with Mr. Browne and Flood, started, in the hope that he should fall in with a tribe seen by Flood at a creek about 20 miles distant. The wind blew from the N.E.; and the blasts coming with tremendous heat, were compared by Capt. Sturt to the scorching blaze of a kitchen fire, insomuch that he was absolutely compelled to turn from them. Any of the dogs would have died on the plain, but the horses stood it well. Crossing an extensive plain, they were beset by a number of large hawks, which came down from the sky in hundreds. One bird had previously soared round them as if to reconnoitre, and shortly afterwards numerous dark spots were seen in the air, which soon became literally speckled with the birds, crossing each other as they wheeled to and fro; some of them came so close that they

might have been struck down with a riding-whip: after a time they resumed their lofty flight. On arriving at the creek the natives had left.

10th.—Having been compelled to return from a proposed excursion by the illness of Mr. Poole, Capt. Sturt made further preparations for a second journey to the N., and left yesterday morning at daylight, accompanied by Mr. Stuart with Flood and Joseph, and with the light cart. Instead of passing by the little hill, a course more to the westward was chosen, by which an easy and gradual descent to the plains was obtained. A creek, previously supposed to flow to the eastward, was ascertained to fall to the westward. At 6½ p.m. halted for the night on a small flat.

11th.—Having filled the tank and casks, and loaded the cart, Capt. Sturt with Joseph (and Punch, with 60 gallons of water in the cart, which he calculated would last eight days, allowing the horse 5 gallons, and Joseph and himself 3 quarts per diem) started on foot. Flood was directed to return to the water at the clump of gum-trees, to await the return of Capt. Sturt and Joseph; Mr. Stuart remaining to sketch the hills. Lat. by Campbell, 28° 38' 5".

12th.—Morning cool; but at noon the heat became excessive, and the horse showed great distress, refusing his food. "We are now, I believe," says Capt. Sturt, "in the most gloomy desert man ever trod; all the sand-ridges are covered with tussocks of spinifex, a thick wiry grass generally found near the sea-coast and only in the most barren situations. The character of the country continues the same, small flats surrounded by sandhills. The sandhills are covered with hakea bushes, all, or the majority of them, dead; and the only shelter was under the cart. These deserts are as silent as the grave. No living creatures save ants are here, even the fly is absent: we have not seen a bird or heard an insect all day, yet the tracks of wild dogs are everywhere visible. How they subsist I am at a loss to imagine."

13th.—The horse showing great weakness, he was unharnessed, and Capt. Sturt mounted him, though without a saddle. The country bore the same aspect, though it became, if possible, even worse. At between 9 and 10 miles got on a small sandhill: from this there was not an elevation of any kind to be seen. The country to the N. and W. appeared to dip, yet a view of 8 or 10 miles was obtained; it was sufficient to depress the spirits of any one. They had now reached the parallel of 28°; long. 141° 22' or thereabouts. No distant peak revealed itself to the N., no reflected light showed that the sun had sunk behind a mass of waters; the horizon was as level as that of the sea, from N. round to N. again, and a deathlike sickly hue pervaded the scene. "In point of latitude we were nearly abreast of Moreton Bay,

and more than 200 miles to the westward of the Darling. When the moon rose we turned our back on this dreary wilderness, and reached the cart at midnight."

14th.—"Fifteen gallons of water still remained in the cart; it behoved us therefore to make the best of our way back: by giving the horse occasional rests and travelling by moonlight, we reached the water-hole where we had taken in our water at 3 P.M. on the 15th, through dreadful heat.

16th.—"Reached the gum-trees at 11 A.M., where we found Mr. Stuart and Flood anxiously awaiting us. Thermometer at 3 P.M. 110°; wind S.E."

17th.—"Leaving Joseph at the water-hole, Capt. Sturt, with Mr. Stuart and Flood, proceeded to trace down the creek. Its course was S.W. and W.S.W., sometimes spreading over flats, but always reforming and increasing in size. At about 12 miles fell on a creek junction (Frome Creek) of considerable size from the S. Halted at night, having travelled about 34 miles.

18th.—"Flood became unwell, and complained that his head was on fire; the heat was excessive. The horses hung down their heads and refused to move. The only object being to trace down the creek, as soon as Flood felt better we retraced our steps. From general appearances I felt assured that I was at no great distance from some decided change of country. Mount Hopeless must have borne S.S.W. of me; and, according to the chart, I must have been in the bed of Lake Torrens. Our camp is 29° 40' S. lat., and in 141° 34' E. long. I am extremely gratified at my journey down the creek. It will enable me to throw the party 80 or 90 miles in advance on the first fall of rain."

21st.—"Reached the camp late in the day. On the 19th, under the shade of a tree, 4 feet from the ground, the thermometer stood at 132°, and in the sun at 157°."

24th.—"We have had no rain since the 20th of November, a period of three months, nor is there the slightest indication of a change; it therefore became a matter of grave importance whether or not a further reduction of rations would be advisable. On examining the stores it appeared that there was a sufficient supply of meat for thirty-two weeks, whereas the flour would last only twenty-nine. It was therefore determined to reduce the quantity of flour to 6 lbs. a-week each, and to make a corresponding reduction in the tea and sugar: these arrangements were cheerfully concurred in by all."

March 1st.—"Every bird and every animal has now forsaken these lonely and inhospitable regions. If any of the former appear, it is only for a moment, to rest their weary wing, and then pass on. Birds of prey, parrots, pigeons, have migrated to the

N.W.; whilst, on the other hand, pelicans, cormorants, and wild-fowl come in from that quarter; the first is a strong proof that there is a better country to which these birds go, the other is equally indicative of there being a desert or a sea between us and it. The service we are engaged on is not such as the exploration of Africa or America, but it is of a peculiar character, requiring the men to throw themselves into situations of great hazard and difficulty."

6th.—A flock of pelicans flew over this morning from the N.W.; Mr. Browne shot one, which had a small fish in it, but it was too much decomposed to determine what it was. Flood started down Evelyn's Creek to the eastward, to ascertain whether it continues beyond the flat on which it appeared to Mr. Poole to terminate.

7th.—Another tremendous day of heat, with an unusually heated appearance in the sky; wind S.E. Flood returned in the evening, having gone 30 miles down the creek, which he found took up again. At 25 miles he struck on a sheet of water in its bed more than a mile long; he saw smoke to the E.S.E., but met with no natives. He found great quantities of the kidney-bean growing on the banks of the creek, on the seeds of which a number of cockatoos were feeding.

9th.—"This day completes the seventh month of our peregrinations, yet here we are, bound hand and foot, as it were, without the power of moving, captives in a large and gloomy prison. Mr. Poole is again very unwell."

10th.—"The morning hot and oppressive, but at 4 P.M. a partial thunder-storm from the N.W., the wind having previously been at E. A little rain fell, but the barometer did not move."

12th.—Capt. Sturt left the camp with Mr. Browne, Flood, Joseph, and Mack, taking the light cart. Proceeded to an old encampment on the banks of Evelyn Creek, it being an object to follow it down as far as possible. A good deal of rain had fallen near it, and there were many ponds on the plains; crossed the extensive flat in which Mr. Poole thought the creek terminated. Encamped for the night, having ridden about 33 miles in a S.E. direction. A meridian altitude of Pollux gave the position $29^{\circ} 56'$.

13th.—Crossed the creek, and took up a course of about 80° , the trend of the creek being 76° . Traversed sandy flooded ground, covered profusely with various grasses, especially rice-grass. Here had been the harvest-field of the natives, their thrashing-floors and heaps of straw chequering the plain. "From the ridge we discovered that the plain extended an immense distance to the S. and S.W., with scarcely a tree upon it, but intersected by small channels which, lined with polygonum, divided

it into spaces resembling fields. We discovered a fine sheet of water, on which were a number of ducks; Mr. Browne went to shoot some, but, as they were wild, he followed them to the other end, and there surprised a native female with a child. She was apparently by herself, but there were two bough-huts near where she was sitting, and the men evidently were hunting. It was not until after we had settled ourselves at the water with the view of waiting for the men, and had allayed the old lady's fears by giving her three or four cockatoos, that she mustered courage to call out, on which three more damsels made their appearance, who had concealed themselves in the polygonum. In the afternoon two men came in, the one had killed nothing, the other had a talpero and a lizard. Although they spoke and understood several words of the Darling language, we could make nothing out of these stupid people. We gave one a tomahawk, and the other a blanket; and at sunset they obligingly sent their women to us, of whom we got rid with some difficulty. The men were both circumcised."

14th.—"The channel of the creek flows round the spur which runs into the flat from the main ridge, and then again spreads over a more extensive plain than the first, extending many miles to the S., and forming an immense bay to the westward. We now struck down the plain. At 6 miles we came to another spur from the ridge, but from it we could see no opening leading out of the extensive basin before us, save to the E.S.E.; we therefore took that route, following it for 3 miles, when we descended into the bed of a large lake now perfectly dry. Traversing this, we again ascended a portion of the ridge, but here we lost sight of all gum-trees, and flooded land and scrub alone presented itself from N. to S. No object being to be gained by advancing, we turned about, and at sunset reached the water we had left in the morning. The natives, probably anticipating our return, had removed to the other side of the water, and had been joined by another family. They told us they had come from the S. in consequence of the total failure of water in that quarter; and they said that there was no water to the eastward. When we informed them that we were going there, they shook their heads, and said we should soon return. We gave the oldest a knife and some ducks, in consequence, probably, of which our camp was at dusk again visited by their sable charmers, who manifested the utmost indignation at our rejection of their favours; one of them openly evincing her contempt of Mr. Browne, by slapping at him the last part of her that disappeared as she left us."

16th.—"Having taken a supply of 46 gallons of water from the creek, we first pursued a course a little to the northward of E., afterwards E. During this day and the following we continued

our exploration; but finding the country impracticable, and that there was no chance, even if a change of country existed, of reaching the Darling, we determined on returning to the creek. At sunset on the 17th we turned our horses' heads to the westward: boiling-point 212° .

20th.—Reached the camp early, and turned our horses out to join their companions. The result of this little excursion, not exceeding 80 miles to the eastward and 25 or 30 to the S., has been the discovery of other permanent water than that on which we are; the knowledge that a fair tract of good land lies to the S.E. of us, and that the distant country towards the Darling is barren and waterless to a certain distance.

24th.—Engaged in taking lunars: the mean places us in long. $141^{\circ} 30' E.$, lat. $29^{\circ} 40' S.$

27th.—The men engaged in preparing various things we are likely to require. Symptoms of scurvy are manifesting themselves. Capt. Sturt complained of head-ache, and his mouth became as if he were in a state of salivation, small pimples appearing on the shoulders and back.

31st.—The month of March has closed in heat and drought, nor is there any appearance of a change of weather."

[The journal here closes, and the remaining portion of this extraordinary and most interesting narrative is extracted from various letters and dispatches of Capt. Sturt.—ED.]

"More than six months have now passed since we pitched our tents in these dreary solitudes, nor have we had a shower of rain since the 19th of November, this being the 2nd of July. The sky is at length overcast, and there is every indication of rain. In consequence of myself and my officers being so constantly employed on detached services, we were obliged to live much on salt meat, and in February the scurvy showed itself upon us all. We were attacked with swollen and ulcerated gums, violent head-aches, pains in the limbs, &c. In my own case, the limbs were free from pain, but I had constant, though not profuse, bleeding from the nose. These symptoms did not increase with Mr. Browne or myself, but Mr. Poole became worse and worse: ultimately the skin over the principal muscles became black, and he lost the use of his lower extremities. Although the more violent symptoms have subsided, he is still very unwell."

July 8th.—Sufficient rain having at length fallen to enable Capt. Sturt to break up the depôt, he proceeded on to the N.W., detaching Mr. Poole, with a third of the men under his charge, to return to Adelaide, both for the purpose of diminishing the consumption of the remaining stock, as well as to request that an additional supply should be forwarded from Adelaide to meet the expedition on the Darling at the end of December. Mr. Poole,

though still unwell, had recovered so far as to render it probable that a few weeks of rest and a change of diet would restore him.

On the 13th, Mr. Poole set off on his return to Adelaide, in one of the drays which had been fitted up for his convenience, accompanied by Mr. Browne during the first day, who returned to the camp on the morning of the 14th; in the afternoon the lad who attended Mr. Poole brought the sad intelligence that he had suddenly expired, almost without a struggle, between 2 and 3 P.M. Captain Sturt and Mr. Browne rode back to the party the following morning, and brought the remains of the deceased to the dépôt, where they were interred. Mr. Poole's death was supposed by Mr. Browne to have been caused by sudden internal hæmorrhage. The command of the returning party was now given to Mr. Piesse, with directions that should any of the men misconduct themselves they were immediately to be struck off the pay-list.

"We have now experienced a difference between the extreme of summer heat and of winter's cold of 133° ; the thermometer having in February risen to 157° , and within the last few days fallen to 24° .

"The direction in which it would be most desirable to penetrate, when circumstances should favour my moving, had constantly occupied my thoughts, and I felt I could not take a more direct course, with a view to gaining the meridian of Mount Arden, than by attempting to cross the country to the westward, in order to ascertain the practicability of it to the N. and N.W. of Lake Torrens. I determined therefore on proceeding towards Lake Torrens, from the creek on which I intended to establish my second dépôt. In moving to that point in a direct line, we found great difficulty in getting the drays over the sand-ridges which intersected our course for more than 60 miles. Our second dépôt was established in lat. $29^{\circ} 6' S.$, and in long. $141^{\circ} 5' E.$ I had employed the men in chaining from our first dépôt towards the creek to which I intended to move; and by supplying them with water, I had enabled them to complete a measurement of 62 miles, on a bearing of 305° ; but as that course would have taken me too far to the N. of Lake Torrens, if continued, I directed Mr. Stuart to change it on our arrival at the end of 62 miles, and to continue the chaining to the westward on a bearing of 255° , until I should overtake him after I had established the camp in its new position. Two days after overtaking Mr. Stuart we were stopped by the broad, dry, and sandy bed of an extensive lake, the men having then chained $69\frac{1}{2}$ miles on the new bearing of 255° . Standing on a high bank, which sloped gradually down to the margin of the lake, our view extended over a great part of it. It here appeared about 12

miles in breadth, extending southwards beyond the range of vision; but it came round to the westward, in a northerly direction, in the shape in which Mr. Eyre has laid down Lake Torrens. According to our measurement from the old dépôt, we were now in long. $139^{\circ} 38'$, lat. $29^{\circ} 15'$, as given by my altitudes of Vega and Altair, on the night of August 5th. From the termination of our chained line, the principal point of a high and broken chain of mountains bore 198° , and a small flat-topped range was visible more to the N., bearing 231° ; the former distant 65, the latter 30 miles. Beyond, to the S.W., the country seemed to be wooded, but, if I except the ranges I have already noticed, no high land was visible in any other direction. On descending into the basin, I found that it was composed of sand and salt, with patches of clay and gypsum, and although apparently dry, that its surface was too soft to bear my weight. It contained detached sheets of dark-blue salt water fringed round with samphire bushes; I felt satisfied that this basin could not be connected with any more central body of water. It only remained to me, therefore, to return to the dépôt with all speed, there to prepare for a more extended exploration of the N.W. interior. We fell in with several tribes of natives, who were evidently availing themselves of the recent rains to wander over the sandy ridges. Returning to the dépôt, it was my first care to take the necessary measures for its safety during my absence. I had a stock-yard erected, in which I gave orders that the cattle were to be nightly confined and mustered; and I marked out the ground for a stockade, to guard against any sudden or hostile display on the part of the natives. Having given instructions to Mr. Stuart, to whom I proposed intrusting the charge of the camp, and the preparations for our journey being completed, I left the dépôt on the 14th of August, accompanied by Mr. Browne and three of the men; taking with me the light cart and two packhorses, with fifteen weeks' provisions. I determined to run on a course 25° to the W. of N., and to persevere in that course until turned from it by some unforeseen impediment. The two days' rain had been succeeded by extreme heat, and little or no surface water now remained; such as there was being so putrid from the number of animalcules in it, or so muddy, as to be unfit for use. In a distance of 86 miles we crossed only two small puddles, the residue of the water in which I collected into wells, to facilitate in some measure our retreat, in the event of being forced back. For the first 70 miles we passed through a country similar to that we had lately traversed; it then became more open, but so dry that I began to doubt the possibility of getting on. At the distance of 86 miles, our anxiety was relieved by our arrival on the banks of a large creek (Strzelecki Creek). It

contained a pool of water of two or three hundred yards in length, and of nearly half that width ; its banks were wooded and grassy, and several large huts near it had recently been occupied : the dip of the country was still to the S. Crossing the creek, on the morning of the 19th, we traversed extensive plains bounded by low sandhills ; the soil on them was similar to that on the flats of the Darling. It was now our good fortune to intersect three other creeks at distances of 15 or 18 miles apart, all of which indicated a southerly drainage. On the last of these (O'Halloran Creek), in lat. $27^{\circ} 30'$, and in long. $139^{\circ} 32'$, we encamped on a clear but brackish pool, in which were many fish, although there were none in the fresh-water pools above. The extensive and flooded plains ceased soon after we left the last of these creeks, and we ascended a confused mass of sandhills, from which we again descended to a tract of salsolaceous formation, in the centre of which was the white and dry bed of a salt lagoon ; after passing through a low and barren scrub, at about 8 miles we found ourselves on the outskirts of extensive grassy plains, similar to that on which I had established the *dépôt*. Traversing these plains we passed into an open box-tree forest ; we soon, however, broke through this, and were again opposed by a wall of sand ; high and broken ridges rose before us of a more formidable aspect than any before encountered, and of a fiery red colour, rising to the height of 80 or 100 feet ; they succeeded each other with the rapidity of sea-waves. The bare sand lay on the summits like drifts of snow, but they were otherwise covered with *spinifex*. This heavy and distressing kind of country continued for more than 16 miles, and we were ultimately obliged to pull up for the night without either water or grass ; the horses were worn out, nor would they have undergone a second day of similar fatigue ; happily, on the following morning we reached a small stony valley, in which we found both. This valley opened upon an immense plain, in which the sandy ridges abruptly terminated ; the plain spread out before us like a gloomy sea, occupying more than half the horizon from south-westward round to the N.E. It was so thickly covered with stones as wholly to exclude the growth of vegetation ; the stones, composed of fragments of quartz rounded by attrition, lay evenly over the surface, and being thickly coated with oxide of iron, gave a reddish-brown and purple tinge to the whole plain. Our horses left no track behind them, nor was there an object on the visible horizon to direct us in our course ; like a ship at sea, we were obliged to steer by compass, and to depend on our own correctness for the chance of retracing our steps. We halted on this plain after a journey of 20 miles, and on the morning of the 28th pushed on, and at 10 miles, after a visible descent of a few

feet only, crossed a polygonum flat of 2 miles in breadth, which ran like a belt along the edge of the stony desert: from this flat we advanced on to plains, apparently of as unbounded extent, but very different in other respects from the adamantine region just passed. This new feature resembled ploughed land, the whole was perfectly destitute of vegetation; a sea of earth, on the surface of which not a herb of any kind was growing, or a single stone to be seen. After wandering many miles over this singular region, with the horizon as clear and level as that of the ocean, we at length observed a solitary clump of trees in the distance, and directly in our course; at the same time some moderately elevated hills, raised above their true position by the strong refraction on the plain, became visible to the N. On reaching the trees we found they were growing on the bank of a small channel, and in this channel was a pool of muddy water; having travelled 30 miles over a very distressing ground, I halted for the night. We were obliged to secure the poor horses to the trees to prevent their straying for food, not a mouthful of which was to be seen. Anxious to relieve the poor animals as soon as possible, I made direct for the hills, and, after travelling from the earliest dawn, reached them a little before noon. These hills were nothing more than a recurrence of the sandy ridges; they appeared to recommence on this as they had terminated on the other side of the stony desert, leaving a broad opening of more than 50 miles between them, running northwards into the interior, without varying a single degree in their general direction: thus apparently traversing the continent from S. to N., as we had already found them for more than 5 degrees. Viewing the features of the country before me, and connecting them with the general character of the interior, I could not but think that the whole of that part of it over which we had passed, had, at one time, been covered by the waters of the ocean, from the level of which, although so far inland, we have never risen more than a few feet; and that by whatever convulsion the present change had been effected, a heavy flood must at one time have swept across the central portions of the continent from N.E. to S.W.

" From the point I had now gained I was enabled to resume my original course: after allowing the horses a few hours of rest we proceeded; at 7 miles we entered an open box-tree forest, and about sunset arrived on the banks of a large creek, which was, however, quite dry; in tracing it, we discovered a well of unusual dimensions, 22 feet deep and 8 broad. As night was fast closing, and there was abundance of grass in the bed of the creek, although the supply of water in the well was quite inadequate to our wants, we pulled up opposite to a village of nineteen huts, some of which were of large dimensions. But if the lords of the soil had retired

from this spot, the birds of the forest resorted to it in great numbers, the woods re-echoed with the cry of parrots and cockatoos, and the trees were crowded with them and other birds. Leaving this spot, at a distance of 2 miles, we issued from the wood upon the outskirts of a plain, the surface of which was so rent and cracked by solar heat, and so full of deep fissures, that we crossed it with difficulty. At 7 miles we struck another but smaller creek, in which we found a muddy and shallow pool; as the horses required rest, I determined on stopping; it, indeed, was necessary, as several of them became very ill and swelled exceedingly. A day of rest brought them round, with the exception of one, which we unfortunately lost. We now found that the further we pushed to the N.W. the worse and more impracticable the country became. We had already been two days without water; I determined, therefore, to proceed a few miles to the N. The temperature had been gradually increasing, and was now such as to cause extreme lassitude both to ourselves and to the horses; they were beginning to feel the want of water, but we providentially found a small pond, in the bottom of which a few gallons remained—muddy indeed, and putrid, but which we could not reject. At 50 miles we found ourselves on the banks of a creek, of greater magnitude and promise than we could have anticipated (*Eyre Creek*), coming direct from the N.N.W.; it enabled me to resume my original course under the happiest auspices. We traced this fine creek for 60 miles without any check; but, although its bed was full of grass, the flat through which it ran was barren in the extreme, and was bounded by sandy ridges of increasing height, behind which other ridges succeeded in such numbers as to render any attempt to penetrate directly either to the eastward or to the westward perfectly hopeless.

“On the 9th of September we were in lat. $25^{\circ} 4' S.$, and in long. $138^{\circ} 15' 31'' E.$, on the last fresh-water pond at the head of the creek, up which we had made such advances during the last three or four days, a point to which I had returned after having failed in an attempt to push to the northward. In pondering over our circumstances I could not hide from myself the danger to which I was exposing myself of being cut off from all chance of retreat to the *dépôt* by the evaporation of the water we had passed. The sky was occasionally cloudy, but no rain had fallen since the 17th of July, whilst the increasing noonday heat was fast licking up the water that remained in the creeks. I made my camp the centre or pivot of my movements, and diverged from it to every point of the compass. To the W., to the N.W., to the N., to the N.E., and to the E., the country was alike impracticable. The 13th found us still struggling against diffi-

culties, such as were not to be overcome by human perseverance. The floodgates of heaven appeared to have been closed for ever from that devoted land, so determined and settled was the drought by which it was visited.

"The increasing indisposition of Mr. Brown, and the impossibility of my leaving him under such circumstances, determined me to make the best of my way back to the depôt, thence again to try and beat my way in some other direction. We were now more than 400 miles from the camp, and I hoped that ere we could reach it rain might fall, and enable me to commence my third journey under more favourable auspices. Our retreat was one of extreme difficulty; we reached our destination on the 3rd of October, with the loss of only one horse, after a journey of more than 900 miles, and an absence of seven weeks. I had been attended by a man who had long been injured to the bush in New South Wales, and who was deemed the hardest and most experienced stockman in the colony; by a lad of twenty-one, whose appearance was sufficient to justify the expectation that he would endure almost any fatigue; and by a weather-beaten sailor: but I may adduce this as an instance of the great superiority of moral over physical strength, that neither of these could accompany me when, in 6 days after my return, I again left the camp; and, on this last journey, as on former occasions, I was obliged to select fresh men to accompany me.

"Every necessary arrangement having been made, I left the depôt on the 9th of October, attended by Mr. Stuart and two of the men who had not been out before. There being no water nearer to us than 86 miles, it became necessary to make for that point (Strzelecki Creek) before I could take up the northerly course on which I intended to run into the interior. We reached the creek on the 11th, and I was glad to find that, although it was greatly diminished, there was still a large body of water in the pool it contained. As the creek came from the N. we traced it up in that direction for some miles, on the morning of the 12th, but, ultimately losing its channel in a large box-tree flat, we left it, and traversed extensive plains bounded by low sandhills. After a journey of 36 miles I was obliged to pull up for the night, although without water. In the morning we perceived from the top of a little hill a broad belt of gum-trees, extending from the eastward to N.W., with extensive plains on either side of it. To the N.E. a lofty and broken range of hills was visible, but at a great distance, and there was an appearance of water or mirage at their base. At 4 miles from the hill we found ourselves on the bank of a splendid creek (Cooper Creek), far exceeding in size any we had previously seen in the interior. We struck the head of a broad serpentine sheet of water, covered with a new species

of duck. Flooded or white gum-trees, of large dimensions, grew on its banks; beyond which, on either side, there was a belt of open and grassy forest-land. Descending to the trees, we were at once stopped by a second creek, larger than the first, the main channel, of which the first was only a branch. The grass in the channel in which we now were was so beautifully green and luxuriant that I determined on remaining stationary for the day, to give the horses the benefit of it, and the rest they so much required after the long and fatiguing journey they had made from the dépôt. The creek at which I was thus momentarily established was 240 yards broad and 26 feet deep, opposite to our camp. It had long serpentine sheets of water both above and below us, and a considerable breadth of open and grassy forest-land on either side. Well-beaten paths, leading from one angle of this creek to the other, led me to infer that I should find a numerous population upon its banks. Yet, with the most favourable appearances, this watercourse, like the Murray River, was in the centre of a desert; for the extensive plains which flanked the belt of forest-land on either side of it were sterile, and in many places herbless, and the whole region was a mass of sand.

“Leaving the examination of the creek and ranges to the period of my return from the interior, I resumed my journey on the 14th, and crossing the creek, which trended to the N.W., I proceeded northwards, over grassy plains, somewhat elevated above the earthy and flooded flats we had recently traversed. At 8 miles we descended to some plains of salsolaceous character, but in the afternoon again ascended to grassy plains, similar to those crossed during the early part of the day, and, at 36 miles, halted near a small puddle left by a recent thunder-storm. Feeling that it was necessary to use every precaution in advancing into so treacherous a region, we here dug our first well, in which we collected all the water we could. On the 15th we travelled for a few miles over the same character of country, but about noon we had the mortification to see once more the sandy ridges rising before us, nor was it long ere we had them on either hand as formidable and barren as ever. They still continued to preserve their former bearing, running up N. in parallel lines at an angle of 20° to the W. of that point. The flats between were either covered with salsolaceous plants or comprised the dry beds of salt lagoons. Nothing could exceed the sterile and inhospitable character the country assumed, or the hopelessness of the prospect before us. At sunset we halted at another puddle, but the horses had scarcely a blade of grass, yet they did not dare to forsake the shallow and muddy puddle. The moon being full, we were enabled by its light to dig our second well, in the event of water failing us in our retreat. We continued our journey,

riding at one time across the white and dry beds of salt lagoons, at others running along the tops of sandy ridges. At 3 P.M. we had a large body of water in front of us, which proved to be a lake (Lipson Lake), 12 miles in circumference; this lake was extremely shallow, and the water in it was perfectly putrid, so that it was wholly unfit for use either for ourselves or the animals. Barren and inhospitable as this region appeared, it was nevertheless inhabited by a more dense population than any other part of the interior we had visited. Riding round the shores of the lake, we passed several villages, consisting of from twelve to twenty huts. We did not, however, see any of the natives; neither were there signs of their having recently visited the neighbourhood. It is evident, from the villages being built on the side of the lake, that its waters must at some seasons be fit for use. They were now partly fresh and partly salt, but both smelt and tasted so bad that it was impossible to drink them; nor could we obtain any other than salt water from the wells we dug round about. One of the results of this second expedition was to prove the fact that all the creeks which Mr. Browne and I had crossed in our first journey were branches of the main creek I had last discovered, and that during periods of floods the intermediate plains were under water: thus proving that the drainage was, as I imagined, from E. or W.

"On leaving the lake I turned a little to the W. of N., to avoid the low and gloomy desert which extended northwards, and at 9 miles stopped at a shallow puddle, the only one we had seen during the day, in which there was just sufficient water for our present use. We were now at a distance of 100 miles from the creek, and although I had taken the precaution of digging wells, I could not reasonably or prudently hope that the sandy soil would retain the water for many days; it became therefore necessary to find some supply of water on which I could rely before I ventured to increase my distance from our known place of refuge. After long and anxious search, we found a small but deep gutter, almost hid from our view by long grass, in which there was a small quantity of water. Calculating that this supply would not fail for some days, I proceeded onwards, and rose at once from the beautiful and grassy plains I had just been traversing to the dreary and spine-covered ridges by which they were bounded to the N.W., and which never ceased until we again found ourselves on the outskirts of the great stony desert. The appearance of this desert was unchanged. The stones that covered it were similar in shape and colour: bare of vegetation, it was not without a feeling of dread that I descended the ridges to commence my journey over it. Crossing its trackless surface in a N.N.W. direction, we reached a low sandhill at about 14 miles, and, keeping along its base to

avoid the stones, our horses being unshod, halted soon after at a small puddle; though the water it contained was inadequate to our wants, our poor animals being fairly worn out with heat and pain. On the following day we pursued our journey, traversing plains and sandy ridges, and at 7 P.M., at 29 miles, having failed in our search for water, we pulled up on a small patch of grass. On the morning of the 25th of October we proceeded down the little valley in which we had slept, towards a line of hills that appeared to be about 12 miles distant, and on turning suddenly to the N. we found that the valley opened out upon the stony desert, which now extended before us to the base of the hills for which I was making. These hills proved to be only sandy ridges of more than usual height, covered over with stones similar to those of the desert itself, in addition, however, to which, sharp-pointed fragments of indurated quartz appeared to have been driven into the sides of the ridges by the force of water. The whole desert, indeed, for some miles, presented the appearance of a vast sea-beach, on which a storm had cast up every-sized rock, and half buried them in the strand. From the top of the highest of these ridges, the eye wandered over a dark expanse of stone: all round the visible horizon the line of the desert was unbroken—if I except at one point to the S.E., where the sandhills we last had crossed rose above it. To the N., to the N.W., and to the N.E., the view extended to a greater distance than was attainable by us in a day, but nowhere could we see a ray of hope. We were now nearly 40 miles from the nearest known water, and the horses had already been without for more than six and thirty hours, and were so weak and leg-weary that I doubted, when the matter was forced on my attention, whether they had strength to return to it, in the event of my determining to do so from this point. I was in a situation in which a false step would have cost us our lives; for the loss of our animals, which would have been the necessary consequence if I had pushed on and failed in obtaining water, would have inevitably sealed our fate. I felt conscious I had done all a man could do. For 10 long weeks I had slept under the canopy of heaven, and had never been sheltered during that time either from the scorching rays of the sun or the still more distressing glare of the moon. Of all who were with me, I alone had been able to hold up against hunger and thirst: I had left those who accompanied me on my former journeys sick and disabled at the *depôt*: I had avoided no labour, shrunk from no danger; I yet could not bring myself to retreat, but, for some wise purpose of His own, it had not pleased Providence to prosper me on this as on former occasions, and in yielding at length to the force of circumstances, I did so under the influence of a Power I could not resist,—a Power that extended His hand to save me from that destruction in which my

own impulses would otherwise have involved me. I ultimately decided on retreating to the nearest water in our rear, having gained lat. $25^{\circ} 58'$ and long. $139^{\circ} 26'$, and we accordingly turned back at noon, having advanced about 12 miles from the valley in which we had slept, and which we again entered about 4 p.m., when I gave the horses an hour's rest, but, instead of eating, they crowded around me, as the only one who had been with them and relieved their former wants for water. At 5 p.m. we resumed our journey and travelled until midnight; but before then one of my horses dropped dead, and I was obliged to abandon him; the others could hardly drag their limbs along, and thus compelled me to halt until the dawn of day, when I again pushed on, and going with Mr. Stuart in advance of the men with the pack-horses, reached the point at which I expected to find water, but none any longer remained; the channel that contained it was dry.

"When the men came up, they reported that another horse had dropped, but that he was at no great distance, and might yet be saved if we could find water. We commenced a search along the line of a little channel formed by a partial and local drainage. Our search would have been unsuccessful if we had not been attracted by a solitary pigeon (the only living thing we had seen for some days in that dreary wild), which, topping the sandhills behind us, pitched for a moment in the grass at a short distance, and then flew away. On walking to the spot, we found a clear but small pool of water, small indeed! but it contained sufficient to relieve us in our distress; and none but those who have been similarly circumstanced can estimate the feelings of gratitude by which we were overcome. Not only was the horse that had been left behind saved by this timely assistance, but all the animals, as well as ourselves, were proportionably strengthened for the trying journey still before us. At this point we were in lat. $26^{\circ} 27'$, long. $139^{\circ} 38'$, and about 137 miles from the great creek, between which and the stony desert we had sunk 4 wells, the first and largest being about 22 miles from us; in that I had no doubt we should still find water, but, with the exception of the little channel on the grassy plain, I had no hope of finding water in any other place between it and the creek, a distance of nearly 100 miles. Considering the weak state of the horses, I deemed it absolutely necessary to give them a day's rest. On the morning of the 26th we crossed the last portion of the desert, and late in the afternoon reached our first well, in which there was still some water remaining; the following morning, however, it was unfit for use, so that we *could* not, and our horses *would* not, partake of it. On arriving at the water-hole in the grassy plain, we found just sufficient water to supply our wants, insomuch that we drained

the last drop from it before we left : had we been a day later, most assuredly we should all have perished.

" We had now a distance of 88 miles to travel, nor did I encourage a hope that we should obtain water until we reached the creek. We left the grassy plains at 6 A.M., and, passing the salt lakes, continued to travel till 6 P.M., halting for one hour at noon. We had now arrived at our second well, but it had been dry for some days. At 9 P.M. we resumed our journey, travelling all night, and retracing our steps by the light of a lamp, the safety of our horses depending on our pushing forward as rapidly as possible. At 5 A.M. of the 27th we gained the first well we had dug, and, to our infinite joy and surprise, found a few buckets of water in it, which, if not sufficient for our wants, were enough to slake the thirst of the animals, and ensure their being able to perform the remaining 36 miles. At 8 A.M. we resumed our journey, and, under the Divine favour, gained the creek at 9 A.M. of the 28th with five of the horses, two having dropped just as we came in sight of it. All of them were reduced to great weakness, and they had worn their hoofs down to the quick. Arrived at a place of safety, we had no difficulty in saving the dropped horses, and I felt that a day or two of rest would in some measure restore them.

" On reflecting over the circumstances in which we were placed, and the work I had yet to perform in the examination of the country and creek to the eastward ; considering (the thunderstorm of the 14th excepted) that not a drop of rain had fallen for nearly four months, but that the earth had been subjected to a degree of heat enough to reduce all it produced to powder, and under the effects of which it was impossible to calculate on the deepest pools long retaining any water, I felt I had no time to lose, if I hoped yet to secure my retreat to the *depôt*, with one place only in the whole distance—118 miles—in which we should find water ; I was therefore unable to allow the horses more than one day's rest. On the 29th, in the afternoon, I proceeded a few miles up the creek, and encamped close to a beautiful sheet of water, with abundance of grass for the animals. On the 2nd of November we had traced the creek upwards more than 65 miles. The higher we ascended the more did the signs of a numerous population increase. Now, however, the large gum-trees which formerly adorned its bank ceased, and a fine species of *Melaleuca* succeeded. The channel lost the grassy intervals in its bed, and resembled an arm of the sea. There was also a peculiar shade in the water, a large sheet of which we were approaching, that raised my suspicions, and on tasting I found it to be brackish. A belt of weeds ran round this water at some little distance from its margin, and between this belt and the brink of the water we observed thousands of small

fish. It is remarkable that we had not seen any fish in any other of the pools, but only in this brackish one, and it immediately struck me as corroborative of the westerly drainage of the interior, since I could no longer doubt that the creeks we had crossed on our first journey were branches of this main one, down which the fish must be taken in seasons of flood.

"On the morning of the 3rd we arrived at a pool, the water of which was of so deep a blue that I at once concluded it was salt, and so we found it—so salt, indeed, that no animal could live in it; yet the very next pool above this was perfectly fresh. From this point the creek gradually fell off; a line of stony elevations bounded it to the N., and some stony plains extended southwards; at about 7 miles the hills receded, and a large grassy plain ran up to the N.E., in which the creek split into numerous narrow channels. There were now some low rocky hills distant about a mile from the creek; from these the view to the E.N.E. and N. was over an unbroken grassy plain (Macleay Plains); to the S. this immense plain was bounded by low dark hills; but to the N.E. and E. the plain bounded the horizon, and we must have gazed upon hundreds of thousands of acres of cleared and grassy land. On descending from the hill I made for a thick clump of gum-trees, under which I expected to find water, and, on nearing them, observed a party of natives approaching us. I dismounted and, with Mr. Stuart, went to meet them. I learned from these people that there was no water to the eastward, but that they had their camp close to a large pool, under the trees to which I was going. One of these men, of whom there were sixteen, was full six feet three inches in height, and all were fine men. I made the chief some presents, and they very kindly showed us the way over the creek. In the distance of 8 miles we communicated with five tribes. I felt assured, from my knowledge of the habits of these people, that we had not yet seen the principal tribe of the creek; and, on ascending a sandhill, I found that I had not been wrong in my anticipations. Our appearance on the top of it was greeted by an almost deafening shout from about 400 natives, who were assembled below. On our riding down, all clamour ceased, on which I dismounted and walked to them, attended by Mr. Stuart. No people could have received strangers with more kindness than did these receive us: the fact is, we had so completely overrun the interior, that our presence was known far and wide. We had, in our excursions, fallen in with many straggling parties of natives, and had had frequent opportunities of relieving them when pressed by thirst, and had ever treated them with kindness. There was an open frank manner about them I had never before noticed in my intercourse with the aborigines. They were also the finest race of men I had seen on

the continent, several of them standing more than six feet high; and, of sixty-nine who had gathered round me, none were under five feet eleven inches. They confirmed the information of there being no water in any direction beyond them; and they gave me to understand that all the water was gone to where we had come from; and intimated by signs that the creek rose in the immense grassy plain. I found it therefore necessary to turn back at this point—lat. $27^{\circ} 46'$, long. $141^{\circ} 54'$. On the 9th of November we reached the place from which we had started on the 28th ultimo, but I could not give the animals any respite or rest; it remained to be seen whether I had already delayed too long to have a retreat still open to me. We were now 130 miles from the *dépôt*; the nearest and only water between us and the camp was in the large pool of the first creek—if indeed any still remained in it—and on this question depended our safety.

“My horses were now so weak that I was obliged to abandon all my heavy luggage, stores, and flour; and I left that creek which I had been tracing with such anxious expectations of success, doubtful whether I should reach, if I may so call it, ‘my desert home.’

“For some time I had felt my strength failing me from both paucity and poverty of food, from continued exposure to intense heat, from ceaseless fatigue, and from anxiety of mind; but I attributed my debility to these causes, and not to any latent malady. We continued our retreat on the 9th, and reached the first creek (Strzelecki Creek), 86 miles from the *dépôt*, late in the afternoon, having timed our retreat to it too closely. There was only just water enough remaining to relieve the thirst of the horses on their arrival, in that pool in which, not seven weeks before, we had seen the wild-fowls sitting, regardless of our approach. We were obliged to make a small trench to drain during the night what was left, but it was rather mud than water, and quite insufficient. About 9 A.M. of the 10th, so terrific a hot wind came on, that I really apprehended fatal consequences to our animals. At noon, our now only remaining thermometer stood at 125° , and on my placing it in a fork of a tree, protected alike from sun and wind, it soon rose to 127° , the height to which the instrument was graduated, and ultimately the bulb burst from the expansion of the mercury. In consequence of the exhausted state of several of the horses, I found it impossible to proceed until 5 A.M. of the 12th, when we started for the *dépôt*, after draining up every possible drop of water, retaining one gallon to give to any horse that might fail. At 2 P.M., and again at 8, I halted for an hour; a little before midnight my favourite horse dropped, but on relieving him of his load, which I abandoned, and giving him some water, he revived, but again fell at 3 o'clock

with another of the horses. It then appeared to me that my best plan would be to push on with Mr. Stuart, and send a dray from the camp with water for the relief of the men, whom I directed to move quietly on. We reached the stockade (Fort Grey) at 11 A.M. of the 14th, but found it deserted; the party had fallen back on the old dépôt, in consequence of the putridity of the water. The men came up at midnight with the loss of the horses which had given in before I left them. Here we were compelled to remain four days before the animals could move. I then again preceded the men with Mr. Stuart, having 72 miles to ride, promising to send a dray with water the moment I reached the camp. I rode this distance in excessive pain, and after having been on horseback 18½ hours, dismounted, feeling very unwell. On the following morning I was confined to my mattress unable to move. My muscles had contracted and become as rigid as boards, my limbs refused their office, and I was laid prostrate. We returned from this journey with the loss of three horses only, after an absence of five weeks, during which we had ridden more than 800 miles.

"Although I had thus providentially reached the dépôt in safety, it was nevertheless a matter of doubt whether the door was still open for our return to the Darling. The country was in so fearful a state from the continuance of the drought, that the ordinary course of nature appeared arrested. For a period exceeding a twelvemonth, only two days' rain had occurred (excepting the thunderstorm), whilst, on the other hand, the heat had been excessive, greater, perhaps, than any traveller was ever exposed to before. The air occasionally became so rarified, that we had a difficulty in breathing, and were obliged to turn our faces from the scorching blasts that crossed the burning region in which we were, on the almost molten surface of which, any matches accidentally dropped immediately ignited. There was a distance between us and the Darling of 270 miles. On our way up the country we had stopped at a creek (Flood Creek), in which there was a tolerable supply of water, but from it we were distant 118 miles: between us and that creek there was a smaller one (Burr Creek), at 40 miles, in which I hoped there might still be water. To that creek I sent Flood two days after my return, but he brought back nothing but disappointment; it had long been dry.

"We were now aware that there was no water nearer to us than 118 miles; and even there it was extremely doubtful whether any remained. Unable myself to move, at a moment when my exertions and my example were equally necessary, doubtful whether we should not have to pass another summer in this gloomy region, it was under such circumstances that Mr. Browne, who attended me as medical officer, and whose attention and zeal deserve my

warmest commendations, volunteered to proceed to the creek, on which our hopes were now centred, to ascertain if water still remained in it. To consent to his leaving me to run such a risk was out of the question, unless I could by some expedient or other supply him with water sufficient to ensure his probable safety. In this extremity, I directed one of the bullocks to be shot, and filling the hide with water, sent it on a dray to the distance of 30 miles on our homeward road. I then arranged with Mr. Browne that he should take the light cart with one horse, and 36 gallons of water, a day's journey beyond where the dray might stop, and then, quitting the cart, ride to the creek, leaving half the water in the cart for his return. None of the horses I had brought back could have undertaken this journey, but we fortunately had left a horse for Mr. Browne's use, which it was determined he should now take; and I may truly say, that no men ever witnessed the departure of a companion from amongst them with greater interest than did we the departure of Mr. Browne on this, to us, most important occasion.

"On the sixth day he returned to us with the joyful news that we were just in time, sufficient water was still in the creek to supply our wants during a passing visit, but no more; and what there was, he said, was as black as ink. It behoved us, therefore, to make all haste; but to have driven the cattle on without the means of relieving them once on the journey in such frightful weather was impossible; I therefore directed three other bullocks to be killed, and with their hides we were enabled to leave the depôt with 600 gallons of water, at 7 P.M., of the 9th of December, not daring to stir during the heat of the day. This remarkable retreat occupied eleven days, during six of which we travelled both night and day. We reached the Darling on the 20th, without the loss of a single sheep, and, under the Divine blessing, joined the party sent out to our relief at the junction of the Williorara.

"For seven weeks I was lifted in and out of the light cart; but I thank God that I rallied under the generous diet that had been sent to me by my friends, and reached Adelaide on the 19th of January, 1846, in comparative health."

Note.—Capt. Sturt's calculations of his longitudes are based upon that of Laidley's Ponds (Williorara), as laid down by Major Sir Thomas L. Mitchell.—Ed.

III.—On the *Yang-tsze-kiang*. By the Right Hon. Lord COLCHESTER and Capt. COLLINSON, R.N., C.B.

(Read March 22nd, 1847.)

[AMONG the important results attending the campaigns in China, may be ranked the knowledge obtained of the course of this magnificent river from the sea to Nanking. In the autumn of 1840, Capt. Bethune, in H. M. S. 'Conway,' with the 'Algerine,' Capt. Mason, and the 'Young Hebe,' was directed by Admiral Elliot to explore the entrance of the Yang-tsze-kiang: a service of peculiar difficulty, which he effectively performed in the months of July, August, and September; and penetrated as high as Fuhshan, 80 miles from its mouth. The task of conducting the fleet up the river in 1842, was intrusted by Sir W. Parker to Captains Kellett and Collinson; who subsequently, with the assistance of Lieut. Hewett, I. N., completed the survey from Nanking to the sea.

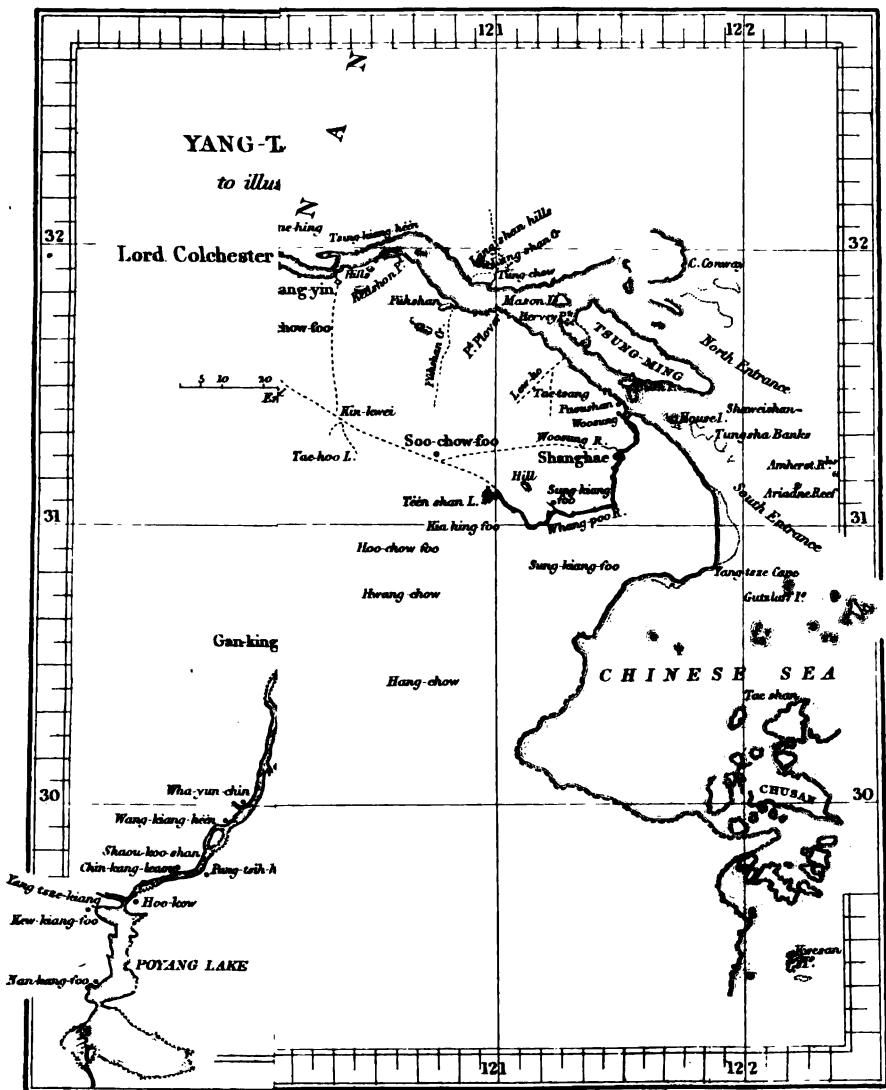
The first portion of this memoir is the result of the labours of these officers; the latter part is from an account drawn up by Lord Colchester, who accompanied the embassy of Lord Amherst in 1816, and was by him directed to make a sketch of that portion of the river which the embassy ascended from Kwachow, at the outlet of the Grand Canal, to the Poyang lake, with such observations as the jealousy of the Chinese would permit.]

THE embouchure of the Yang-tsze-kiang is about 60 miles wide at Tsung-ming island, between points Conway and Yang-tsze-kiang: it is divided into two branches by that island, which is entirely alluvial, being 30 miles long and 9 broad. It was formerly styled Kiang-she, or 'The Tongue of the River,' and was used as a place of banishment for criminals, by whom embankments were built; thus, from being a sandy desert, it became very fertile, and was established about the end of the last dynasty (A.D. 1600) as a "Heën," or district magistracy of the third class. The cotton-crops are very abundant, and the land is lightly taxed in consideration of the exertions made to recover it from the sea. There is also a manufactory of salt, and a large fishery.

The eastern end of the island (called by the Chinese Changshwuy, or Deep Water Point) is in lat. $31^{\circ} 29' N.$, and long. $121^{\circ} 51' E.$ from Greenwich, and is distant 15 miles from the southern bank of the river; the intervening space being much obstructed by sand-banks.

Twenty miles to the E. of Tsung-ming is the island of Shaweishan, which rises to the height of 196 feet above the sea; its geographical position being $31^{\circ} 25' N.$ and $122^{\circ} 14' E.$

The Amherst rocks and Ariadne reef lie to the southward of Shaweishan; the former, which is 10 feet above the sea at high-water, is in lat. $31^{\circ} 11' N.$, and long. $122^{\circ} 22' E.$ The latter has 3 feet water over it at low tide, and bears W. by S. $\frac{1}{2}$ S., $7\frac{1}{2}$ miles from the former.



Gutzlaff Island (210 feet high) lies 22 miles to the S. of these; its position being lat. $30^{\circ} 47'$ N. and long. $122^{\circ} 11'$ E. It is 17 miles from the southern cape of the Yang-tsze-kiang.

None of these islands or rocks are sufficiently large to afford protection in bad weather, and they are too far from the entrance to afford good leading marks over the bar, rendering the navigation somewhat difficult. Arrangements have been made for the erection of beacons to facilitate the navigation, and the Chinese Government have been induced to guarantee their being preserved. Keying also has come forward most handsomely, having ordered the expense of their erection to be borne by his Government. The most important channel into the river is along the southern bank, in which there is a depth of 24 feet at low water; its trend being N.W. $\frac{1}{2}$ W. 50 miles. The shoal water extends to seaward, opposite the southern cape of the Yang-tsze-kiang, which is called Tee-pan-yen-sha, or Hidden Sand, by the Chinese. On the northern side, two of the sand-banks, viz., House and Bush Islands, at the distance of 19 and 29 miles from the sand-heads, have, like Tsung-ming, been reclaimed from the sea, but at a more recent date. The Whangpoo (or, as it has been improperly called, the Woosung River) joins the Yang-tsze-kiang opposite Bush Island, being rather less than a mile wide at the junction; on the right is the walled town of Paoushan; the village of Woosung is upon the same side $2\frac{1}{2}$ miles farther up, and is a miserably dirty street, but derives its importance from being the custom-house, at which all the Chinese junks bound to Siam, Cochin-China, Singapore, &c. clear, both on arriving and departing.

Shanghae (in lat. $31^{\circ} 15'$ N., and long. $121^{\circ} 29'$ E.) is on the left bank of the Whangpoo; the distance from Woosung by the river being 13 miles, and by land between 8 and 9. Shanghae is still called a hoo or lake. The image of the man who is said to have recovered it is preserved in the temples; and once a-year is borne round the walls, followed by a large portion of the population. This town, to which we have now access, and consequently uninterrupted water communication, by means of the Imperial Canal, with the northern provinces of the empire, has already more than fulfilled the eager anticipations of those who from the first took an interest in the place. Boats laden with cargo at Shanghae can communicate with eight different provinces, the most important, rich, and populous of the whole empire.

The facility of intercourse will, ere long, constitute this port a formidable rival to Canton; as there is not only the advantage of immediate communication with the Grand Canal, but we are also brought considerably nearer to those localities which produce the

staple articles of exportation, viz., tea and raw silk. Hoo-chow-foo, on the south-western bank of the Tae Hoo Lake, is the great centre for collecting the Nanking raw silk; it is reached from Shanghai in a dispatch-boat in 36 hours.

Hwuy-chow-foo, on the eastern side of the mass of hills, where the green teas are produced, is reached by easy water communication by boats laden with cargo in 10 days. The climate also being well adapted to European constitutions, and the intercourse with the natives being free from that ill-will which the Canton people appear determined to foster, will tend to render this a more favoured resort.

A plot of ground, with water-frontage, immediately N. of the city, has been allotted to foreigners; opposite to which vessels drawing 17 feet of water are enabled to anchor; and a custom-house for the especial use of the foreign trade has been erected in the immediate vicinity. (See note at the end of this paper.—Ed.)

Shanghai is a city of the third class, under the jurisdiction of a district magistrate; but in the city is the residence of a Taoutae, or Military Intendant of Circuit of the Departments of Soo-chow-foo, Sung-kiang-foo, and Tae-tsang-chow. This officer resides here in consequence of being *ex officio* the Comptroller of Maritime Customs of the province of Kiangnan; and consequently the superintendence of the trade with the western nations is under his control.

The Woosung river joins the Whangpoo to the N. of Shanghai, forming the northern boundary of the location allotted to us. By this river the grain junks go to the Great Canal, which it joins in the vicinity of Soo-chow-foo; a dispatch-boat can reach that city from Shanghai in 10 hours. The Taoutae once made a journey from Shanghai to Nanking in the winter in 9 days, as follows:—

By Water. From Shanghai to Soo-chow . . . 36 hours

” ” Soo-chow to Chin-kiang-foo 48 ”

By Land. From Chin-kiang-foo to Nanking . 14 ”

He was there during the day, and, starting in the evening, had a quicker return. The iron steam-vessels of the expedition pursued the course of the Whangpoo river, in a southerly and westerly direction, 40 miles beyond Shanghai, in the first 30 of which they had a depth of more than 4 fathoms; at the distance of 23 miles from the town on the left bank is a creek, the entrance to which was defended by a battery, and which leads in all probability to Sung-kiang-foo. The latter, which most likely will be found within a mile of the Whangpoo, is the chief city of the department: the country in the immediate vicinity of the river is a dead flat: the only hill visible, which is 6 miles from the banks here, is in lat. 31° 8' N., and long. 121° 7' E. Seventeen miles

beyond this creek they arrived at the Tëen-shan lake, having first passed over a depth of 6 feet. Here the Whangpoo ceases, but the water-communication unites with the Grand Canal in the direction of Kea-hing-foo, and thence leads to Hang-chow-foo (the provincial city of the Che-kiang province), which can be reached in 30 hours from Shanghai.

The boats are very comfortably fitted up for the accommodation of passengers, and usually contain three apartments. The boatmen occupy a raised platform at the stern, and the universal mode of propulsion is the scull, at which from three to six men work; they are fitted with two taunt (tall) spars, which are stepped, like sheers, in a frame on the roof for hoisting a sail; and so arranged as to be easily let down, in order to pass under the bridges, the height of the arches being generally less than 8 feet from the water. Channels, into which the tide flows, intersect the country in all directions, forming the means of communication throughout the whole district.

The country on the eastern side of the Whangpoo partakes of the same character. Cotton is everywhere extensively cultivated, as the vicinity to the sea is supposed to improve its quality. That this tract has long been gained from the sea is proved by the fact of there being four walled towns on this side, and also by the size of the trees. A portion however (about 13 miles long and 2 wide) has been reclaimed more recently: and the land is still extending, affording, without the outer embankment, excellent pasturage for cattle; and *some carts*, almost the only ones we met with in the southern parts of the empire, were seen here.

The bunds, or embankments, which are 10 feet high and 20 broad, are vast monuments of the labour and industry of the inhabitants, and plainly prove the dense population of the district, which is amply corroborated by the constant succession of villages and hamlets.

Returning to the main river, its width opposite to the junction of the Whangpoo is 6 miles, with a depth of 8 and 9 fathoms.

Bush Island lies 5 miles N. of Paoushan Point; the navigable channel is, however, confined to 2 miles by sand-banks, through which there is a channel in the vicinity of House Islet, which is used by the junks trading to the northern ports or to Tsung-ming; in it there is a depth of $2\frac{1}{4}$ fathoms at low water; it is intricate, and by no means so eligible a channel to enter by as the southern one. The same may be said of those on the northern side of Tsung-ming, no less than 4 of which were explored, until a depth of less than 3 fathoms was attained. The difficulty of fixing the positions in a rapid exploring survey of this description, which must have been attended with great labour and anxiety, was, in some measure, obviated by having recourse to the

artificial horizon on the ship's deck at slack tide ; and is a useful hint to those who may be similarly situated in an enemy's country, without remarkable features to aid them, and with the natural horizon in that ill-defined state it usually is in the vicinity of large rivers.

Twelve miles to the N. of Tsung-ming is another large island, but of this portion, with the exception that you cannot enter the river on this side without passing over a depth of less than 18 feet at low-water, little is known. The junks, however, are numerous, and are seen at anchor among the shoals in all directions.

Between the Yang-tsze-kiang and the Whangho, or Yellow-River, there are 6 ports available for small vessels, and which communicate, according to the Chinese maps, with the Grand Canal, previous to its junction with the Yellow River; but all the pilots who were questioned concerning the navigation of the latter, described it as impracticable, owing to the strong tides and shifting sands ; and that the junks, when opposite to its mouth, were compelled to stand far out to sea. At the mouth of the Yang-tsze-kiang the tide flows on full and change days until 12 o'clock, and the rise and fall is 15 feet. At Woosung the tides are 2 hours later, and the rise is 18 feet.

We left the main or S. branch of the river where the Whang Poo joins it, or 30 miles from the mouth ; the deep-water channel continues on that side 17 miles further ; and here is the confluence of the Lew-ho River, which is important, as it was deepened and made navigable direct to Soo-chow about 10 years since by the celebrated Commissioner Lin. Flowing from Soo-chow it forms a junction with the Woosung River at a place called Sha-ho ; and then passing the district towns of Kwānshan and Sinyang (which are both contained within the same walls), and the departmental city of Tae-tsang, it reaches the Yang-tsze, being confined near the mouth by a dam, up which the boats are drawn by means of an inclined plane and capstans. The distances of these places from the river may be assumed as follows :—

Soo-chow	40 miles
Kwānshan and Sinyang	22 „
Tae-tsang-chow	14 „

The deep-water channel then takes a turn to the northward, passing close to Point Harvey (the western end of Tsung-ming, and named after a young midshipman of the 'Conway,' who was killed here in a skirmish with the Chinese, while landed with a foraging-party). Point Harvey is separated from Tsung-ming, and is called Chang-an-sha by the Chinese. N.W., 4 miles from it, is Mason Island (so called after the Commander of the

'Algerine'), the channel between the two being 3 fathoms deep; and that between Mason Island and the N. side of the river 6 fathoms deep and 6 miles wide.

From Harvey Point the trend of the reach is W. by N. $\frac{1}{2}$ N., and 14 miles from it the river contracts its width to 5 miles, with a depth of 13 fathoms; this may be termed the throat: the distance from the sea in a straight line being 55 miles, and by the S. channel 70 miles. The flood here runs only 4 hours; and some hills begin to make their appearance: those on the N. bank have a pagoda on them, and are $3\frac{1}{2}$ miles from the river's side. On the S. bank, and 8 miles inland, is another and larger range; and 9 miles above Point Plover (as the point on the southern side of the river at its throat has been termed) some low hills come down to the water's edge, which are called Füh-shan by the Chinese; and here is an important communication with the Grand Canal, affording the shortest access to the city of Soo-chow from the river, the distance being about 30 miles. The Füh-shan creek, on its way to Soo-chow, passes through a walled town, which it divides into the districts of Chang-Jeuě and Chaou-Wăn; according to the Chinese maps, these are situated at the eastern foot of the hills mentioned in the last paragraph.

Thus far Capt. Bethune's chart carried us, and we had now to grope our way where the officers of the Chinese empire had reported to their master it was impossible for us to go; and the only information for our guidance was the account of the visit of the pirate Coxinga: who, Le Compte informed us, "passed easily up to Nanking;" but at present the Chinese vessels of carriage do not enter the river, either because the mouth is choked up, or it is disused that the knowledge of it may by degrees be lost.*

The channel between Plover Point and Fühshan is along the southern bank, but at Fühshan it crosses over to the northern side of the river; and it was some time before a sufficient depth of water for the 'Cornwallis' and the larger transports was discovered. On our return down the river two months subsequently, the freshes had washed away many of the shoals, and a good channel was formed; so this portion of the river, from its constant changes, will probably be found the most difficult part of the navigation; the distance across is 12 miles, and the course about N.

Here, on the N. side of the river, is the mouth of the Läng-shan creek, which leads to the city of Tung-chow-foo (the capital of this department), and which will probably be found about 4 miles from the river; from it there is an inland water-communi-

* The sea-borne junks terminate their voyage at Fühshan.

cation northerly, which, passing within 30 miles of the coast, and communicating with the sea by six estuaries, forms an inland navigation to the eastward of the Grand Canal, which it joins at Wei-gan-foo; having first passed the towns of Jookaou and Yen-ching, whence it takes a westerly direction, crossing the N. head of the Shay-yang lake. Yen-ching, by the Chinese maps, appears to have an immediate communication with the sea by the Sin-yang creek, and will probably be found a large emporium, but difficult to be got at in consequence of the shoals.

Tung-chow-foo, however, is likely to become hereafter a favourable mart to foreigners, as thus far the tides—those aids to navigation in rivers—are felt. Keashan, which at first appears like an islet, is an isolated cliff on the S. shore, about 16 miles from Fühshan; the trend of the intervening coast being N.W., thence it runs W. by S. $\frac{1}{2}$ S., and at the distance of 7 miles the hills again approach the river.

The town of Kiang-yin is situated on the southern side of the river, and 116 miles from the mouth, being nearly environed by hills; a spur from which, stretching out into the river, narrows its width to little more than a mile, and affords an eligible position for defence.

Kiang-yin is a place of importance, and affords another communication with the Grand Canal at the district towns of Kin Kwei, and Woo-yang, which are situated at the N. end of the Tae-hoo lake. On the N. side of the river there is the district town of Tsing-kiang-hëen, situated close to the river's side, but was not perceived by us; it communicates with the eastern canal at Jookaou, and there is also a branch which runs westerly, nearly parallel to the river, to Taehing. The effect of the tide ceases to be felt here, there being no regular daily rise and fall or change in the direction of the stream.

The Yang-tsze, from Kiang-yin, takes a W. by N. direction; and 18 miles above the town is Starling Island, where the navigable portion of it becomes much confined, the deep water being close along its eastern shore.

The banks on the southern shore are low cliffs, with several large creeks communicating with the chief city of the department, Chang-chow-foo, situated on the Great Canal, and which will probably be found about 8 miles from the river. The N. shore, which is very little elevated above the river, abounds with rushes, and is intersected with creeks, some of which communicate with Tae-hing, a town of the third class, about 7 miles inland: and, if faith can be placed in the Chinese maps, affords another inland navigation, as channels branch off to Jookaou, on the eastern canal, and also to the city of Tae-hing, and from thence to the Imperial Canal. Starling Island is 5 miles long, and towards the

N. end is separated into 4 by narrow channels: opposite to the end of it, on the western side of the river, is Shayaou creek, which, after separating a large tract, communicates with the main branch 20 miles higher up; there is a depth of 3 fathoms throughout it. From this island the river trends N. 10 miles, the deep water being on the western side; it then takes a westerly turn, with a middle ground, a portion of which is dry when the river is low. Pursuing this course 8 miles it turns to the S., and the Chooshan hills, with a temple on their summit, will be seen extending their spurs into the eastern side of the river; from their summit a splendid *coup d'œil* of the whole country was obtained.

The Shayaou creek, mentioned above, joins the main river immediately to the N. of these hills. The course of the river to the W. of Chooshan is most curious, forming a circular basin about 9 miles in diameter, which, however, was nearly filled up by 6 islands. The navigation, notwithstanding, proved simple enough, as the deep water was found along the right bank of the river: but the strength of the current proved a serious obstacle, compelling us to wait several days for a slant of wind. Following the southern shore (which here presented a nearly continuous range of hills), at the distance of 12 miles the river took a sudden turn to the W., disclosing at once Kinshan, or Golden Island, with its handsome pagoda and beautiful buildings: attention, however, was first of all attracted by Silver Island, which lies exactly at the turn of the river, being separated from the southern bank by a channel 3 cables' length wide, through which the current was boiling with great rapidity. The temples on it are prettily situated, embosomed in trees, with which the islet is nearly covered; at the water's side was a spacious landing-place, ornamented with fantastic gateways, and on the main opposite, which was a precipitous cliff, was a broad flagged quay, affording the junks the means of tracking their way against a current which even the steam-vessels found a difficulty in stemming. Galleries were run along the face of the cliff, communicating with chambers hollowed out of the rock, the strange shaped peep-holes out of which afforded great amusement.

The reach now opening upon us took a W. by S. direction; and upon the southern shore, or right bank of the river, 2 miles above Silver Island, and about 600 yards from the water-side, appeared the walls of a city, which proved to be the one we were in search of, viz., Chin-kiang-foo. The opening of the Imperial Canal was not distinguished; but we discovered what pleased us nearly as much—large heaps of coal piled up by the water-side ready for our use. Some buildings also, totally unlike the Chinese style of architecture, and corresponding in some measure with our own, caught our attention, and proved afterwards to overlook the entrance to the canal.

The accompanying plan of the communications of the Imperial Canal with the river will show its connexion better than any description.

Chin-kiang-foo, known as well by the denomination of King-kow, or Mouth of the Capital, is the residence of the Intendant of Circuit of the Departments of Chin-kiang and Chang-chow. Here also is a Mwanchow Tartar garrison under the command of a Lieutenant-General.

Kinshan, or Golden Island, situated $1\frac{1}{4}$ mile west of the city, was found to be in lat. $32^{\circ} 13'$ N. and long. $119^{\circ} 31'$ E., 182 miles by the river, and 130 in a straight line from the sea; it is nearly in mid-channel, which is here three-quarters of a mile wide, and covered with trees and buildings (the tiles of which are gaudily glazed), and was pronounced by every one to merit its name.

The southern bank of the river is beautifully diversified by hills, with which the city is nearly surrounded: the N. shore presents nothing but a level plain, fringed towards the water with reeds, except to the N.W. of Golden Island, where low cliffs make their appearance. Here are the remains of the walled town of Kwachow, now nearly deserted, but through which the principal arm of the Imperial Canal passes. About 6 miles N. of it is the temple of Kaou-min-sze, in the angle formed by the division of the Imperial Canal into two branches,—one leading to Kwachow from Yangchow-foo, which is distant about 6 miles, and is the chief city of the department; and the other to Eching, beyond which it joins the Yang-tsze, forming the usual communication with Nanking. This temple * contains 200 priests, and within its enclosure stands a pagoda, ascended by 136 steps: from the top is an extensive view. To the N. is the city of Yangchow-foo, with its pagoda, surrounded by a level and well-wooded country, in many places inundated; † under foot are the gardens of the temple, containing artificial rocks and pieces of water: to the S. the branches of the canal wind their way to the Yang-tsze, that river itself, with the island of Kinshan, and an extensive range of high hills, bounding the view in that direction.

The surrounding country is cultivated with rice, beans, buckwheat, and Kaou-leang (a species of millet, from which is manufactured an ardent spirit) in small quantities; mulberry-trees, bamboos, the small-leaved elm, and other trees were observed.

Six miles west of Kwachow commences a low island, separated from the N. bank of the river by a channel about the breadth of the Thames at Richmond; it is 5 miles long, low and flat, chiefly covered with tall reeds, used by the Chinese for embankments. The main body of the fleet passed on the southern side of it, the northern channel having only 15 feet in some places.

* Sir G. Staunton.

† Possibly rice-fields.

Opposite to its west end, on the southern shore, is a large creek, which will probably form another island, and communicate with the main river near the Sekea hills, thus giving the boats an opportunity of escaping the strong stream in the main branch, which generally runs 3, and sometimes attains a velocity of 5, knots per hour. Our large Chinese chart, which would probably have set the question at rest, unfortunately does not extend to the westward of Chin-kiang-foo.

The mouths of the canals—for there are two of them which communicate with Eching, and thence join the Imperial Canal—are 13 and 14 miles from Golden Island, the river running due west.

We were now no longer in a “terra incognita,” having come, at Chin-kiang-foo, on the track of Lord Amherst’s embassy, and were supplied from the Hydrographic Office with a chart of this portion of the river by Lord Colchester, who accompanied that expedition.

Great numbers of vessels, of different construction, were lying in this channel: the salt-junks are very remarkable, being built nearly in the form of a crescent, the stern rising in some of them nearly 30 feet and the prow 20, while the mast is 90 feet high: * they are said to convey salt from the coast up the Chang-kiang (the conventional name applied to the Yang-tsze by the inhabitants), as high as the province of Hookwang; the return-cargo generally consisting of coal. They differ much in their build from the junks at Shanghai, and, not having been noticed at the latter place, are probably not permitted to pass lower down the river than Fühshan; many of them had chain-cables and iron anchors or grapnels.

The river beyond the West Eching creek takes a W.S.W. turn; 3 miles above it the most considerable range of hills we had hitherto seen on the N. side of the river, comes down to the water-side.

Seven miles further on the same side is the mouth of the Lewho creek, flowing into the Yang-tsze-kiang from the N.W. The pagoda of Lewho-hëen stands on a hill, 7 miles in the same direction. Immediately opposite, on the southern shore, are the Sekea hills, the highest of which is remarkable from two trees and a small joss-house on its summit, whence a fine view of the country was obtained, and the whole course of the river from Golden Island traced: on the N. shore another creek was seen joining the Lewho, one 3 miles S. of the pagoda, and running into the main river 5 miles further up: directly at the foot of the hill was a creek, which was traced so far in an easterly direction as to give rise to the surmise that it communicated again with the river, forming a large island.

* Sir G. Staunton.

To the westward the view was obstructed by numerous hills, which now rose on both sides of the Kiang, rendering it doubtful which way it would turn, and forming an agreeable change to the dull monotony of the level country we had hitherto been traversing.

Three and a half miles further, the river changed its course four points, the reach trending W.N.W., the force of the stream on the southern shore being turned by some bold red bluffs, which were named after the 'Cornwallis' (Sir W. Parker's flag-ship), in order to perpetuate the name of the first line-of-battle ship that penetrated thus far from the sea, and sailed farther from salt water than any of her predecessors, except those launched on the Canadian lakes.

Two miles from Cornwallis Bluff the island of Tsaouhea commences; it is nearly 7 miles in extent, being separated from the south shore by a channel 200 yards wide, with a depth of 5 and more fathoms.

The main branch, which is a mile wide, continues in a W.N.W. direction 5 miles from the bluff, and then takes a S.W. $\frac{1}{2}$ S. turn, the north-western shore being lined with hills, at the southern termination of which was a pagoda (Pingshan) and a small battery.

Supposing, from all accounts, that the city of Nanking was 3 miles inland, and deeming ourselves opposite to it, the two little surveying-vessels, 'Starling' and 'Plover,' were left here, and their captains returned in the iron steam-vessels to pilot the fleet up. In the interim, Lieut. Bate of the 'Plover' pushed his researches 3 miles further, and, coming upon the angle of a walled town, had the satisfaction of discovering that the flag-ship could be placed within 1300 yards of Nanking, the defences of which appeared well manned and armed, but, instead of interfering, or preventing his making a plan by which the 'Cornwallis' was conducted at once to her berth, they sent on board an officer with a present and a paper, which afterwards proved to be a proposal for peace.

Thus a river-navigation of 225 miles was concluded, 150 of which were previously unknown; and the fact that more than 70 sail of vessels penetrated thus far without encountering a disaster sufficient to render any one of them inefficient, will at once reflect creditably upon those who commanded, and, at the same time, prove the river admirably adapted for navigation.

The city of Nanking, at present called (officially) Kiangning, or the chief city of that department, is about 31,700 yards, or 18 English miles in circumference, being shaped something like a ham that has been cut in two different places; the knuckle, which is the northern end, being 500 yards from the water side, and nearly opposite the southern end of Tsaouhea island.

Commencing on the western side, the walls of the city, which

are generally above 40 feet high, take a S.E. by S. direction, enclosing some low hills; a canal or creek runs nearly parallel to the wall, in some cases approaching close to it; at its entrance on each side is a considerable suburb, some of the houses in which had more than two inches water on their floors during a fresh in August.

In an angle of the wall, and not quite a mile from the N. corner, is the Esung gate, which is little used, this portion of the city being but thinly inhabited. Two miles further the hills end, and the wall takes a S.E. direction. On this face are the Shiching and Sanshan gates, the whole length of the south-western side of the city being rather more than 9000 yards. This angle is thickly populated, and forms an area (exclusive of the Tartar portion) of about $9\frac{1}{2}$ English miles. The canal passes close under the corner of the wall, and there is a branch leading off to the westward, which communicates with the Kiang 4 miles to the S. of Tsauouhea island. The wall then turns to the E. by S. for 1600 yards, and nearly midway is the Tsupan gate, opposite to which, and on the western side of the canal, stands the celebrated porcelain tower: it is of nine stories and 260 feet high, with projecting balconies at each story, the balustrades of which, formed of stucco, are highly glazed in gaudy colours.

The view from the summit was exceedingly pleasing, as nearly the whole of the interior of the city could be traced, together with the adjacent country; the large tent-like roofs of the temples, and the curious gable-ends of the pawnbrokers' shops, shone out among the sea of houses below, which were so closely packed together that the streets could scarcely be traced. Towards the east end an inner wall was seen, separating the Tartar cantonment from the remainder of the city, and within this another enclosure, surrounded by water, which, from the size and appearance of the buildings within, was presumed to be an imperial residence. Directly underneath were the large court-yards and extensive temples of the monastery to which the tower belongs, with low undulating hills covered with copsewood in their rear.

Further to the E. was an extensive plain, crowded with hamlets and good country-houses, among which, and adding greatly to the beauty of the prospect, canals were seen in every direction. To the N.E. a high hill threw out its spurs until one of them almost protruded into the city; and at its base the mausoleum of the Ming dynasty, with its paved approach, guarded by colossal images of men and beasts, could be distinctly made out.

The wall takes an abrupt turn northerly 1700 yards, then easterly 2500 yards; in the retiring angle is the Thangsi gate, and here the Tartar city commences; then it pursues a N.N.E. course 2800 yards. On this side the canal, which has hitherto followed

the course of the wall, ceases, in the vicinity of the Chang-yan gate.

The N.E. face is irregular, running first N.E. 500 yards, and here the Tartar cantonment is again separated from the town by a wall running W.N.W. until it meets the other from the Thangsi gate; the whole area of the Tartar city being 11,200 yards. The outer wall then goes N. by E. 320 yards, W.N.W. 900, N. by E. 240, and N.N.E. 80, when we are at the N.E. corner, and opposite to the Changshan hills, the summit of which is crowned by a small white building, whence another bird's-eye view of the city and adjacent country is obtained.

The wall, which here is lofty (40 to 50 feet), turns to the westward, enclosing some low hills, and at 1000 yards is the Taiping gate, forming the principal thoroughfare from this side of the city, and whence a good paved road leads to Kwanyinmun, situate on the river's side, about 7 English miles distant, in the creek which forms the Tsaouheia island.

To the W. of the Taiping gate is a shallow sheet of water, along which the wall runs irregularly, first in a westerly, then in a northerly direction 5300 yards, and here is the Teshing gate; within this portion are isolated hills, with some temples upon them, but there are not many houses.

Pursuing an easterly direction 3700 yards, and N.W. by W. 1400, we arrive at the north end of the city, whence a S. by W. turn 700 yards brings us to the point from where we started.

Remains of an ancient wall encompassing the present city, and embracing an area of 28 English miles, were also traced, but in some instances the vestiges were difficult to detect, and it never appears to have been of the height, or built with the same solidity, as the other.

At Kwanyinmun there is a temple on a rocky promontory jutting out into the river, and there the gentlemen of the embassy appear to have landed, as Sir George Staunton mentions a large slab of black marble bearing an inscription, that many vessels having been lost in the eddies of the stream during the night beyond this point, this stone was erected in the seventh year of Keenlung, to advise and warn all persons to anchor here, so as to pass the next headland during daylight.

A range of hills commence at Kwanyinmun, and continue along the shore, facing the island of Tsaouheia until within a mile of Nanking. On the same side, and nearly opposite the S. end of this island (which was named Theodolite Point, and was determined to be in lat. $32^{\circ} 6' 20''$ N., and long. $118^{\circ} 52'$ E.), an ample store of coal was found.

The river opposite the city is without islands, and a mile and a half (English) across, with a depth of 25 fathoms and rocky bottom.

The current runs at the rate of from 3 to 5 knots per hour, rendering it necessary to steer the vessels while at anchor.

On the opposite or western bank an extensive wall was traced, probably enclosing the town of Pookeu.

The furthest point reached by the expedition was 13 miles above Nanking; where the river, having previously expanded to more than 3 miles, including the islands, which are flat and covered with rushes, again contracts between two headlands to a mile: that on the right bank is called Sanshan.

The 'Modeste,' Captain Watson, being detached here to interrupt the communication, witnessed the Chinese dredging for coal; the probabilities are, however, that it was not *in situ*, but the result of a wreck.

The climate of this part of China is said to have gradually become much colder in the twenty years preceding 1816; previously it had hardly ever been known to freeze or snow at Nanking, which it now (1816) does constantly every winter. The N.E. monsoon usually sets in before the middle of October. Chen-eu-tsuy, in lat. by observation $31^{\circ} 42' N.$, and about 30 miles from Nanking, is a small village on the left bank of the river at the mouth of a canal leading to the city of Ho-chow, a town standing on a rising ground about 3 miles from the river, and appeared to be a place of some trade. The river from Nanking to this place is wider than below, and nearly free from islands. About 11 miles above Chen-eu-tsuy, the Kiang receives the waters of the New-to-ho, a small river flowing from the W., and passing the city of Han-shan-hěen, about 15 miles from its mouth.

About 2 miles beyond the mouth of the New-to-ho are two remarkable rocky headlands, one on each side of the river, called Tung-leang-shan and Se-leang-shan (Eastern and Western Pillar Hill).*

The city of Woo-hoo-hěen, in lat. by observation $31^{\circ} 20' N.$, stands at a short distance from the right bank of the river; it is very populous, and appeared to carry on a greater trade than any other place seen by the embassy since entering the Kiang. The distance from Nanking to Woo-hoo-hěen by the river is about 50 miles. There are numerous islands in the river between Chen-eu-tsuy and Woo-hoo-hěen.†

About 15 miles above Woo-hoo-hěen a considerable stream joins the Kiang from the W., said to come from the lake Chaou-hoo.

Tung-ling-hěen is about 48 miles S.W. from Woo-hoo-hěen: though a city of the third class, it is small, the walls which surround it very low, the streets ill paved, and the shops inferior. It

* Se-leang-shan, about 500 feet high.—DAVIES.

† Large rafts of timber, with sheds erected upon them, dropped down the river by means of anchors; when seen at a distance they resemble small islands.—ELLIS.

stands in a beautiful country, consisting of a succession of hills covered with firs and small oaks, and valleys cultivated with cotton and buckwheat. The right bank of the river near Tung-ling-hěen was a steep rocky cliff of 50 to 100 feet. Nine miles beyond Tung-ling-hěen is the large village of Ta-tung-chin. The lat. was found by the mean of several meridian altitudes of the sun to be $30^{\circ} 45'$ N. The tea-plant and tallow-tree were seen in this neighbourhood. To the S. is a high range of mountains called the Kew-hwa-shan. The course of the river continues interrupted by a series of islands, some highly cultivated, others producing reeds only.

Gan-king-foo, the capital of the province of Gan-hway, stands on the left bank of the river, which there flows nearly due E. : it is 66 miles from Tung-ling-hěen. It is large and populous, and seems to carry on a considerable trade; near the eastern gate is a handsome pagoda of seven stories.

Tung-lew-hěen, about 24 miles S.S.W. from Gan-king-foo, stands on the right bank of the Kiang, at the mouth of a stream falling into the river from the S.E. The walls are extensive, but they contain a considerable quantity of vacant ground.

About 15 miles above Tung-lew-hěen is Wang-kiang-hěen, on the left bank of the river, on the border of the province of Kiang-se.

Eleven miles above Wang-kiang-hěen, and 3 miles below Pang-tüh-hěen, is the Shaou-koo-shan, a remarkable conical rock about 200 feet high, standing in the middle of the river. Its northern side, completely bare, and almost perpendicular, was covered by innumerable flocks of the Yu-ying, or fishing cormorant, but on the western side is a small monastery consisting of several buildings rising one above the other. The only ascent is by a flight of steps. Above the buildings is a grove of trees, and the summit is crowned by a temple of two stories, with projecting roofs. One of the boats being obliged to anchor above this rock, near the middle of the river, found the depth to be 14 feet.

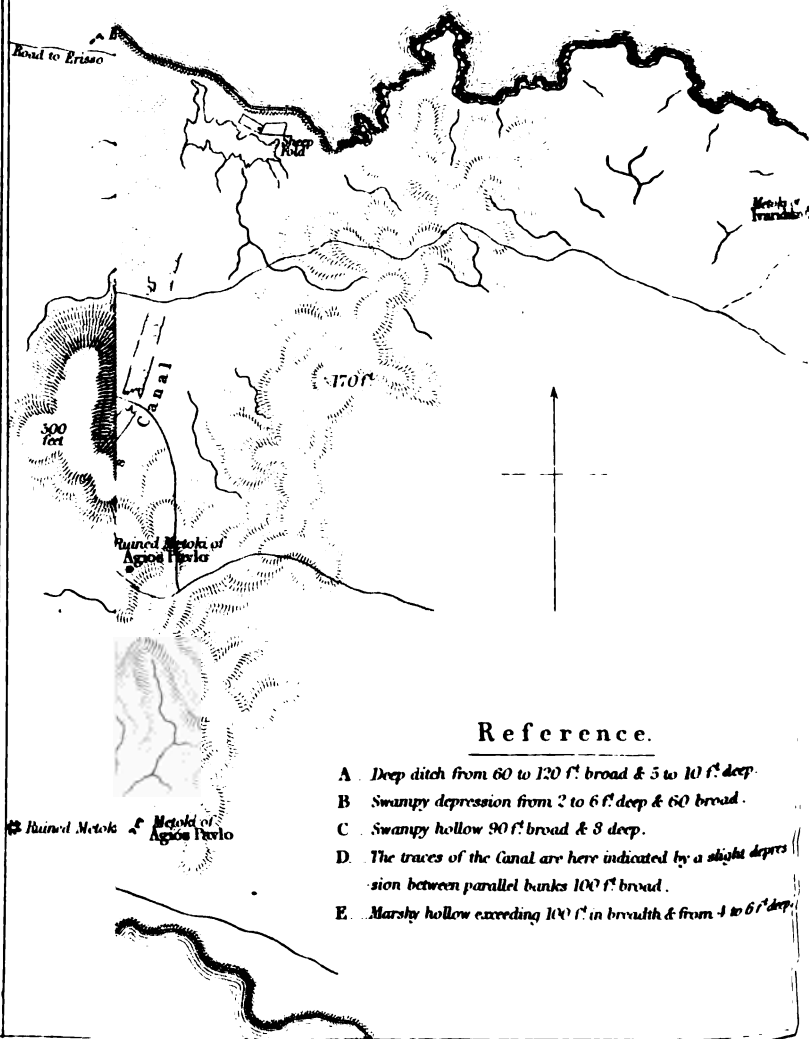
Chin-kang-leao is a small village situated in an extensive plain on the left bank of the river. Its lat. by observation is $29^{\circ} 47'$ north.

About 10 miles above Chin-kang-leao is the small town of Hoo-kow-hěen, whose walls (like those of Pang-tüh-hěen) extend along the summits of the surrounding hills, enclosing much unoccupied ground. This city is built at the foot of a range of hills extending along the right bank of the river as far as Tung-lew-hěen. It is about 74 miles from Gan-king-foo, and 285 from Kwachow. At this place the Yang-tsze-kiang receives a considerable accession of water from the Poyang lake, the stream issuing from the lake appearing nearly equal in width to the river above the junction, each about a mile broad.

187

By

OF ACANTHUS



Reference.

- A. Deep ditch from 60 to 120 f^t broad & 5 to 10 f^t deep.
- B. Swampy depression from 2 to 6 f^t deep & 60 broad.
- C. Swampy hollow 90 f^t broad & 8 deep.
- D. The traces of the Canal are here indicated by a slight depression between parallel banks 100 f^t broad.
- E. Marshy hollow exceeding 100 f^t in breadth & from 4 to 6 f^t deep.

Soon after passing Ho-kow, the embassy quitted the Yang-tsze-kiang, after having proceeded up it about 285 miles in the course of 26 days. That part of the river which they navigated flows in a N.E. direction, with a current of more than 2 miles an hour, till it meets the tide near Nanking. Its mean breadth is from a mile to a mile and a half, except where interrupted by islands; but in some places it expands to 3 miles. The islands are numerous, and in general flat, some highly cultivated, others covered with tall reeds, used for embankments or fuel. The country on the right bank of the river is mountainous, and in many places the hills are uncultivated, but on the left bank are extensive plains in the highest state of cultivation.

The great land-route from Canton to Peking crosses the Yang-tsze-kiang by a ferry, not far above the confluence of the waters from the Poyang lake.

Note.—With reference to the Port of Shanghai, our present favourable position is mainly attributable to the firmness, discretion, and conciliatory bearing of Major Balfour, of the Madras Artillery, our Consul at this port from the period of its being thrown open for trade in November 1843 to September 1846.—ED.

IV.—*Remarks on the Isthmus of Mount Athos.* By Lieut. T. SPRATT, of H.M.S. 'Beacon.' Communicated by Commander GRAVES, F.R.G.S.

[Read 9th March, 1846.]

IN the latter part of August 1838, I was sent by Commander Graves, in the 'Beacon's' tender 'Isabella,' to measure across the Isthmus of Mount Athos, at the spot where the canal was cut by Xerxes. (Herodotus, vii. 22, &c.) The reason assigned by the historian for making this cut was the remembrance of the loss sustained by the fleet of Mardonius (B.C.) in attempting to navigate the shores of this mountainous peninsula. (Herod. vii. 22; vi. 44.)

As the examination of the remains of this work of Xerxes occupied part of my time during the survey of the Isthmus, I offer a few observations to explain the accompanying plan which was then made of it, the more particularly as the few remaining traces of this canal may have totally disappeared in another century, when the absence of such evidence might perhaps again produce doubts upon the truth of this historical record, such as have been expressed with regard to the veracity of Herodotus on this point, both in ancient and modern times. These doubts, however, as well as those of the eminent traveller Pococke, who is one of the sceptics of modern times, have been fully confuted by the testimony of Choiseuil Gouffier, Dr. Hunt, and Colonel Leake. A careful examination of the locality removes all doubt.

On the 27th of August we entered the Gulf of Mount Athos, now Monte Santo. After passing close along the west shore, in sight of the monasteries situated at the base of the magnificent mountain which gives its name to the Gulf, we sailed within the wooded island of Mouillane, and anchored off the S. extremity of the canal, opposite to two rocky hills, between which the canal opened to the sea through a natural valley, which descends from the hilly ground in the centre of the isthmus. This hilly appearance of the isthmus certainly looks unfavourable to the execution of the design of Xerxes; but Herodotus, in his minute description, has not neglected to mention the undulating or hilly character of the part of the isthmus through which the canal was cut.

Herodotus (vii. 23), in his account of the manner of carrying on the work of excavation, shows that no impediment existed in the nature of the ground; for we have an illustration of the softness of the material dug through in the double labour which was said to have befallen the parties engaged in cutting it, by the falling in of the sides or banks of the canal; the Phœnicians alone avoided this by making the excavation in the highest part twice the width of what it was to be in the lowest. This fact is confirmed by the geology of the district. The part of the isthmus through which the canal was cut is a bed of tertiary sands and marls, so that this work of the Persian king, on which three years were spent, is really insignificant compared with many works that are executed at the present day.

The veracity of Herodotus has probably been questioned upon two grounds: one from a false idea of the magnitude of the project, and the other from the apparent absurdity of such an undertaking. The above facts confute those who maintain the former opinion. The motive of the king, as Herodotus conjectures (vii. 24), was to show his power and leave a memorial.

Two rocky hills embrace the S. extremity of the canal: the highest of them, which is of a remarkable conical form, and rises to the height of 155 feet, stands on the E. side of the canal. The other, which is about 30 feet high, terminates a chain of heights which descend from the hills at the back of the modern village of Erissa or Erissos, apparently the ancient Acanthus. Between the two hills is a small pool, in a ditch or water-course, with steep clay banks, 10 feet deep and 120 broad. Beyond the ditch the pool narrows gradually until it is joined by a watercourse and a small stream which flow into it through a valley on the W. side of the isthmus. Turtle and small eels abound in the swampy bed of the watercourse. The ditch, however, continues about 100 yards beyond the junction of the watercourse, towards a hollow or depression of the isthmus, through which the canal

must have been cut, but there is nothing in this part that would lead a casual observer to suppose that the ditch was more than the natural result of the winter torrents flowing from the neighbouring hills; and certainly it shows no indications of a connexion with an artificial cut. Further on, however, in the more elevated part of the isthmus, the evidences of the canal are more decisively indicated in a succession of swampy hollows which run in nearly a straight line across, and are from 2 to 8 feet deep, and from 60 to 90 broad. These hollows may be traced nearly to the top of the rise, where all evidences of the canal are destroyed by a road which leads to the promontory. Two or three other tracks or paths cross the site of the canal at different points, and have each had a similar effect. It is indeed surprising, considering the period which has elapsed since the canal was cut, that even a vestige of it should now remain.

The highest part of the isthmus through which the canal was cut is 51 feet above the sea, and this appears to have been about the original level of the ground previous to the excavation; so that the greatest depth of the soil cut through could never have exceeded 60 feet, and this only for a short distance, for the hilly ground occupies but a limited portion of the isthmus, between which and the N. shore is a small alluvial plain. The traces of the canal on descending to this part are less distinct than on the opposite side of the isthmus, but still the chain of hollows which here also indicate it, have a decidedly artificial character, quite different from a natural watercourse. Through the plain all traces have disappeared, and also the mouths of the canal, which is not surprising, for Herodotus mentions the difficulty which was felt in keeping them open, to effect which mounds were made about the mouths of the canal on account of the surf (*ῥυχίν*), in order that the mouths might not be filled up. This plain was probably the meadow, in which a market was held for the sale of provisions and necessities to those engaged in the excavations. (Herod. vii. 23.)

Near the shore is a small shallow marshy lagoon, which seems to occupy the position of this mouth of the canal, and near it some Hellenic foundations were observed by Colonel Leake, which may have had some connexion with it. The distance between the two shores is about 2500 yards, but the length of the canal rather exceeded that distance, in consequence of its being slightly oblique to the direct distance across the isthmus. Herodotus estimates the width of the isthmus, at the place where the canal was made, at about 12 stadia, or 7200 Greek feet (vii. 22), which agrees very well with the true dimensions.

Herodotus (vii. 22) says that Sane, an Hellenic city, was situated on the isthmus in which Athos terminates. The cities situ-

ated *within* (ἐντός) Sane, and on the side towards Athos (ἔσω τοῦ Ἀθῶ), which the Persians then designed to make insular instead of continental, are these—Dion, Olophyxus, Acrothoon, Thyssus, Cleonæ. There is no difficulty in this passage to those who are acquainted with the language of Herodotus. Sane was on the isthmus, and it is a probable inference from the whole passage, that it was on the N. side of the canal. Thucydides (iv. 109) says, "That the tract called Acte projects inwards (that is, towards the peninsula of Athos) from the king's canal; and Athos, a lofty mountain in the Acte, terminates on the Ægean Sea. It (the Acte) contains Sane, a colony of Andros, by the side of the canal turned to the sea towards Eubœa, and the other cities are Thyssus and Cleonæ, and Acrothoon, and Olophyxus, and Dion." The inference from this passage is that Sane was within the canal towards the isthmus. Its site is generally supposed to be near the S. extremity of the canal, but the spot cannot be clearly identified by any existing remains, much less at the spot assigned to it in the map of the isthmus published by M. Choiseuil Gouffier in 1791, where, certainly, no such ruins are to be seen; and in neither locality is the ground such as was generally chosen by the Greeks for the position of a city, and particularly such a one as Sane, which resisted the army of Brasidas, and refused to submit when he had encamped under its walls.

In his enumeration of the cities in the peninsula of Athos and on the isthmus, Pliny (*Nat. Hist.* iv. 10. ed. Harduin) does not mention Sane. Uranopolis, which was founded by Alexarchus, brother of Cassander, king of Macedonia, and which Pliny does mention, has been considered to be on the site of Sane, on the supposition that it merely took the name and place of that city; but I accidentally found the ruins of a city which had escaped former travellers, on the W. side of the canal, which may be the site of Uranopolis. These ruins are situated on the summit of a hill about a mile to the westward of the canal, and consist of the walls of an Hellenic fortress, the foundations of the entire circuit of which are visible above the ground, and at its N. face, near the foundations of a round tower, two or three courses of the squared smooth blocks of limestone of which it was built appear above the ground. The enclosed area is strewn with broken fragments, but no buildings are visible. Crossing the low hills to the S. of the fortress is a long low wall with towers at intervals; it is evidently an ancient construction, though composed of small unhewn stones, and appears to have been a line of demarcation, as well as a defence between the territory of the cities within the promontory and those without, of which the nearest was Acanthus. I did not observe any remains of a similar wall descending from the fortress to the N. shore, but my examination

of the port was not sufficient to enable me to speak positively on the point.

The territory of this city must necessarily have extended over the low ground much within the canal, for any extension to the westward would approximate too closely on the Acanthian territory; and, besides, the range of hills situated between them presents a natural boundary between the cities and territory of the peninsula and continent.

On the E. side of the canal a long low ridge stretches across the isthmus, and juts out into the sea to the N., forming a rocky point which bounds the bay of Vatopidhi, so named from a ruined metoki at its western extremity. This ridge is terminated on the S. side of the isthmus by the high conical hill which stands near the S. extremity of the canal. On this ridge are the ruins of two metokies or farms, which were formerly dependent on the monasteries of Pavlo and Kilandari, situated at the foot of Mount Athos. These, as well as several others in the neighbourhood, were built in the form of a castle, for security. Between the above two metokies and the conical hill is a small mound standing on the summit of the ridge, which appears to be artificial. Col. Leake has also remarked its artificial appearance in his 'Travels in Northern Greece.' This may be the mound erected by the army of Xerxes in honour of Artachæes, one of the directors of the canal, who died whilst the king was staying at Acanthus. (Herod. vii. 117.)

The Acanthians used to sacrifice to Artachæes as a hero; from which fact, and the context of the whole passage in Herodotus, we may infer that the mound was near Acanthus. Near the base of the mound are five or six hewn blocks, which are the only ancient remains now visible on any part of the adjacent hills, and apparently too insignificant to mark the ruins of an ancient city; and the above conjecture seems to explain their existence better than that they are the remains of the city Sane, as some suppose.

The composition of the hills included in the present plan is divided between gneiss and mica slate, and tertiary beds of marl, sands, &c. Those which lie on the E. side of the canal are composed of the former, as well also as the two rocky hills which embrace the S. extremity of the canal, where the schists are nearly in a vertical position, and contain garnets in great abundance. The hills to the westward of the isthmus as far as Acanthus (Erisso) are composed of horizontal beds of a tertiary deposit, apparently a freshwater formation, but no fossils were seen in it.

The order of superposition at the part which I examined, was first 150 feet of stratified sands and clays, 100 of indurated clays

and marls, blue and white, which was capped by 20 or 30 feet of a white calcareous stratified rock, in which were small flinty nodules.

V.—*Abridged Account of an Expedition of about 200 miles up the Gambia, by Governor Ingram.* Communicated by the Right Hon. the EARL GREY.

[Read 26th April, 1847.]

ON the 17th of December, at noon, 1842, Governor Ingram embarked at Bathurst on board the cutter 'Emma,' for Mac Carthy's Island, accompanied by the Rev. William Fox, General Superintendent of the Wesleyan Mission at the Gambia, Mr. Thomas Chown, a merchant, and Mr. Simon Pignard, interpreter of native languages to the Colonial Government. At 4 P.M., passed Dog Island, Laming Point about 7, and at 8 arrived off Albreda. A French war-steamer was lying at anchor at Albreda, having the Prince de Joinville on board, and having ascertained that his Royal Highness was desirous of visiting the town and public buildings at Bathurst on the morrow, Governor Ingram returned to receive him, resuming his voyage on the 19th, and landing at Albreda at 5 P.M. of that day. The Government residence is described as a wretched-looking dilapidated building, and so entirely surrounded by trees, jungles, rank weeds, and high grass, that it could not but be unhealthy, did not its low and swampy situation already make it so. The native village called Albreda is about 200 yards further from the river-side than the buildings occupied by the French, and stands on higher ground. The party having disembarked, walked to Jillifree, a small village, though one of the best on the banks of the Gambia. Here were great numbers of very fine orange-trees, lime-trees, and groves of bananas. Many of the native Mandingoes speak English, and a white face is by no means a novelty. In the neighbourhood were numerous ant-hills, some of them 12 or 15 feet high, and nearly as much in diameter; the white ant is exceedingly destructive, frequently destroying the floors, beams, doors, and window-frames of the buildings. Re-embarked, and, on the 20th of December, passed Jillifree, James Fort, Vintan Creek, Moota Point, and the large native town Tankerwall. The natives have a tradition of there being a tree, haunted by an evil spirit, called the 'Devil's Tree,' on Moota Point, and that it occasionally burns at night. They hold it in great dread, and will not venture near it. Arrived off Jamaly Cunda, and landed: twenty years since this was the most flourishing place on the banks of the river, being then the rendezvous of the gold mer-

chants from the interior: it is now of comparatively little importance: the native inhabitants are peaceable and well-disposed. Passed Tinderbar, once a town of much trade, but now rapidly declining, and arrived at 11 P.M. off Devil's Point. Weather foggy and cold. Thermometer 59° in the forenoon, at 3 P.M. 65°; heavy dews during the night. Passed Balana, a small town situated in a very picturesque spot at the foot of a high hill of sand and ironstone. This would be a healthy spot for Western Africa were it not for the mangroves which grow on either side of it, which, flourishing only in swampy muddy places, prove by their mere presence any place to be unhealthy. The thermometer at 8 A.M. stood at 61°, and at 2 P.M. 74°.

22nd. Passed Bye and Bading Creeks; these are both noted for the numbers of alligators which infest them, some being about 12 feet long. In the afternoon passed Brandy Creek, Barraconda, Observation and Doomasansang Creeks on the right, and Bambally Creek on the left; arrived within 4 miles of Cower, and landed. The trade of this town is considerable; the principal articles of produce being corn, millet, hides, country cloths called pangs or paynes, ground-nuts, ivory, and wax. There are several large native towns at a short distance from the trading port, and these all bear the name of Cower. The articles most in demand are rum, tobacco, gunpowder, iron-bars, coral and amber beads. The largest-sized Gambia horses are here to be obtained, but the prices are comparatively high.

23rd. "Passing Cower, proceeded towards Yanimaroo, which having reached within 8 miles, and while waiting for the flood, dispatched the interpreter with a message to, and a present for, Sandebar, the chief king of the country, requesting him to meet me at MacCarthy's Island. Mr. Pignard brought me a message in reply, requesting I would meet him at Yanimaroo, where he would wait for me; proceeding thither with the flood, I landed and was received by the king. I found him to be a man of superior intellect to the great mass of his subjects. On expressing my wish to enter into a treaty with him, according to the 'model agreement' received from her Majesty's Government, he willingly acquiesced; and when pressed by Mr. Fox and myself to send one or more of his sons to MacCarthy's Island, to be educated at the Wesleyan Institution, he, after some hesitation, consented.

24th. "Landed this morning on the largest of the three Baboon Islands, having passed on our way the celebrated Red Hill of Casson and the village of Contoo. This hill stands about a mile inland, and is remarkable for its rich deep red colour; we estimated its height at 150 feet. The Baboon Islands are of little value, being inhabited only by a few natives; they are, however, infinitely better than the Deer Islands, which are little else than

immense swamps, and uninhabitable from their unhealthiness. About 3 P.M. passed the native village Brekama, and, approaching the three Kayeye Islands, we saw numbers of hippopotami; they frequently appeared above water, but close to those parts of the shore which were covered with reeds and rushes.

25th. "Landed at Fort George, MacCarthy's Island, and visited a portion of the town entirely inhabited by liberated Africans. Some of these had prospered, and, to judge by the comfortable and cleanly appearance of their houses, many were evidently in easy circumstances; their wives and children were decently dressed in English costume, and seemed contented and happy. A large number, however, did not present so pleasing an appearance, their huts and their persons manifesting the presence of penury; extreme want, or death from positive destitution, being unknown in this country. In the afternoon visited a native village of 800 inhabitants, about half a mile from the British settlement; the people were nearly all Mandingoes, and were orderly and well-behaved; they have various tradesmen amongst them, such as blacksmiths, weavers, and shoemakers, but there are no regular carpenters, tailors, or builders. Those engaged in commerce stand highest in the estimation of their countrymen, and are frequently also priests or maraboos. The huts, which are generally round, are built of dry mud, or sand and mud: the walls are seldom above 6 feet in height and 1 in thickness; the roofs are constructed of bamboo rafters, extending 4 or 5 feet beyond the walls on which they rest, reaching to within 2 feet of the ground. The roofs are conical, the bamboo rafters being bound together at the top, and diverging from a point until, at the outer extremities, they are full 30 inches apart; they are light, and, when well thatched, are impervious to wet, their slope being at an angle of about 50. The ordinary size of the huts is from 12 to 16 feet in diameter: they are without windows, and are, consequently, nearly dark within, having merely loopholes for the admission of air."

During the time Governor Ingram remained at MacCarthy's Island, the kings of Nyambantang and Catabar, with their attendants, paid him a visit, and a treaty for the encouragement of commerce and the suppression of the slave-trade was signed with both of them.

Jan. 1. "This day I had a vast number of visitors from among the black and coloured population, who came to wish me a happy new-year. I thought them as well conducted and far more respectful and polite than persons of their class at home. When it is borne in mind that but very few indeed among them can read or write, much praise is due somewhere for the visible improvement in their habits and feelings. A few short years ago, many

of the persons who this day called to pay me complimentary visits were as utterly uncivilized as it is possible for human beings to be; now they are able to address me in my own language, which is also theirs, for the different tribes of liberated Africans communicate with each other in English only, and their children know no other. This almost incredible change from savage life to one of comparative refinement, has been effected in ten years; for the first liberated Africans sent here were embarked under my superintendence for MacCarthy's Island, in 1832. After my visitors had departed, I accompanied the Rev. Messrs. Fox and Swallow, Wesleyan missionaries, to Lindoe, a village consisting of a small row of very neat little cottages in the English style, built of brick, and erected by the munificence of the philanthropic Dr. Lindoe. These cottages, 12 in number, have each 4 rooms, and their English appearance is delightful to witness in a place 150 miles in the interior of Africa; they are given, rent-free, to such members of the Wesleyan connexion as the missionary may select from the most industrious and most deserving of his flock."

The Foulahs are decidedly handsome, many of them being of a light copper-colour, although the majority are considerably darker. Their features are regular and good, and, unlike the Mandingoes and Joloffs, they have small mouths, European lips, and noses inclining to aquiline; hair soft and silky, but not woolly: well-defined black eyebrows, long eyelashes, and handsome black eyes; tall, well-proportioned, and of erect and graceful figure; some of the young women are very good-looking, and would be considered beautiful even in Europe. The Foulahs wear great numbers of gree-grees or amulets, composed of paper of all sizes upon which portions of the Koran are transcribed, and covered with silver, copper, or leather. 'I have,' says the author, 'seen men and women so laden with gree-grees, that the shape of their persons was not discernible, and they were apparently as destitute of symmetry as a rum-punchoon.'

Jan 4. The cutter having been dispatched at daylight, with orders to proceed up the river with the flood, Governor Ingram and his attendants followed in the boat at 2 P.M., and at 5 overtook the cutter lying at anchor about a mile below Barsangsang. On the 5th of January passed by Pisania, the place which Mungo Park last started from for Woolli. At Pisania the ruins of a factory are still visible near the river-side; there are at present no inhabitants, although during the time of the slave-trade it was a place of considerable importance. Anchored opposite Lower Coonda Point. At daylight on the 6th the thermometer stood at 57½. Got under weigh with the flood, and reached Coodachay; the banks of the river are here high and covered with trees and

bushes; thousands of guinea-fowls were observed. Reached Foulah Tenda, and had an interview with the chief of Chacoonda, who expressed a desire to enter into a treaty as the other chiefs had done: the terms having been explained to him by the interpreter, he signed the treaty in the presence of the Alcades of Bankoobar and Foulah Tenda, receiving in return the ordinary presents.

8th. " Having landed, visited several native towns in the vicinity of Foulah Tenda, the largest being Bankoobar, inhabited wholly by Sononkays. On the 9th arrived at Bannatenda, and in the afternoon had an interview with Mamadoo Wally, the chief of Coro, with whom a treaty for the extension of commerce and the suppression of the slave-trade was concluded. Leaving Bannatenda, passed several trading villages, and on the 11th anchored off Fattatenda; here several of the king of Woolli's ministers were waiting for us, who reported that their master was too infirm to meet us at Fattatenda, but would be glad to see us at Medina, a town 30 miles inland. Horses having been provided, started for Medina; at noon reached Jaconda, where we remained for the night; this town is unusually clean, and strongly protected by mud walls against any aggressions. The heat during the day had been perfectly oppressive, the thermometer in the sun rising to 125°. Leaving this town on the following morning, we arrived at Medina about 11 A.M. The soil of this part of the country appeared to be excellent, capable of producing anything that will grow within the tropics. Medina, the chief town in Woolli, is protected by a strong mud wall, and a stockade and ditch; its population about 2,000. It is almost exclusively inhabited by Sononkays, or fighting-men; these Sononkays are most drunken fellows, indulging in the free use of ardent spirits whenever they have an opportunity. Having been introduced to the king, the subject of the treaty was entered on: and the particulars being explained to him, he demanded what present he was to receive; expressing himself satisfied, the treaty was duly executed with certain formalities, the king signing it in Arabic—Mr. Pignard having previously rendered it into Mandingo, and the king's 'Wooday' repeating it to his master. Returning to Fattatenda, embarked and proceeded up the river for Cantalicunda; owing to strong freshets, and the flood tides being scarcely perceptible, made but little way; and it was the afternoon of the 17th before we reached within 5 miles of that place. Preparations were now made for proceeding early the following morning to the Falls of Barracunda in the boat, all further progress in the cutter being impracticable. These preparations were, however, set aside, in consequence of numerous reports that the Sononkays purposed

opposing our passage, and firing upon the boat from the banks of the river, unless they received a large present of rum."

A consultation being held, it was determined to abandon the visit to the Falls, and orders were given for returning with the evening ebb. Landed, and having obtained an interview with Cantaliba, an old chief, a treaty resembling that made with the other chiefs and petty kings was signed in duplicate, one copy being retained by either party. Returning on board, the cutter was got under weigh for Bathurst, which place was reached on the 25th of January.

I N D E X.

- Abáí, 10, 12, 14, 22, 25, 35, 72, 79.
 Abessinia, 3.
 Acanthus, 146, 148, 149.
 Acrothoon, 148.
 Acte, 148.
 A'degrat, 5.
 Adit, 11, 35.
 A'dowa, 4.
 Agamie, 5.
 A'gaumider, 8, 9.
 Alaba, 60.
 A'lata, 15.
 Albreda, 150.
 Aléltu, 16.
 Alligators, 151.
 Amhára, 15.
 A'muru, 16.
 Ana—branch of Darling, 87.
 Angrab, 8.
 Angúya, 5.
 Anker (Anquer), 22.
 A'nsaba, 5.
 Arc Angelo, 46.
 A'rri, 7.
 Artachxes, 149.
 Artificial horizon, 133.
 A'shangí, 6, 82.
 A'sher, 9.
 Astaboras, 2.
 Atbarah, 2, 3.
 Baboon Islands, 151.
 Bading Creek, 151.
 Bahr el Abyad, 8, 21, 29, 35, 37, 41, 66, 68, 69.
 Bahr el A'swad, 3.
 Bahr el Azrek, 8, 10, 12, 26, 32, 35.
 Bahr el Ghazál, 37, 67.
 Bahr el Makádah, 39.
 Báko, 48, 50.
 Balana, 151.
 Bambally Creek, 151.
 Bankoobar, 154.
 Bárakwa, 4.
 Báro, 27, 31, 43, 49.
 Barranconda Creek, 151.
 Barros, 28.
 Báshilo, 15, 16.
 Belád el Súdán, 2.
 Belamili, 11.
 Belfudi, 11.
 Béllegas, 7.
 Bérkona, 15.
 Beshori, 11.
 Biála Mount, 7.
 Biégamider, 7.
 Birbir, 48.
 Bizámo, 72.
 Blue River, 8, 13.
 Boiling-point, 96, 97, 100, 114.
 Bolássa, 9.
 Bonney Lake, 86.
 Bóra, 7.
 Botor, 49.
 Brandy Creek, 151.
 Bruce, 5, 9.
 Burr Creek, 128.
 Bush Island, 133.
 Bye Creek, 151.
 Caillaud, 4, 9, 32, 35.
 Campbell Creek, 97, 100.
 Canal of Xerxes, 145.
 Cassander, 148.
 Castelli, 39.
 Cawelli, 87.
 Cawndilla, 91, 92.
 Cereal Creek, 102.
 Chang-an-sha, 134.
 Chang-chow-foo, 136.
 Chang-jeuë, 135.
 Chang-kiang, 139.
 Changshwuy, 130.
 Chaou-hoo, 143.
 Chélga, 8.
 Chen-eu-truy, 143.
 Chinese passage-boats, 133.
 Ching-kiang-foo, 132.
 Chin-kang-leaou, 144.
 Chin-kiang-foo, 137, 138, 139.
 Choiseul Gouffier, 145, 148.
 Choosan, 137.
 Chúa, 7.
 Cleonæ, 148.
 Cockatoos, 112, 113.
 Combes, 5.
 Contoo, 151.
 Conway, 130.
 Coonbaralba, 93.
 Cooper Creek, 120.
 Cornwallia, 135.
 Cornwallia Bluff, 140.

- Cower, 151.
 Coxinga, 135.
 Dábana, 40.
 D'Abbadie, 5, 44, 48.
 Dámot, 72.
 Darling, 88, 89, 98.
 Derthéssa, 13, 24, 27, 28, 31, 51.
 Deer Islands, 151.
 Dembea, 8, 15.
 Dender, 8.
 Devil's Tree, 150.
 Dibúk, 16.
 Dion, 148.
 Djal, 39.
 Djámma, 15, 16, 79.
 Djímma Káka, 59.
 Dobárwa, 5.
 Dóko, 66.
 Domasausang Creek, 151.
 Dúrra, 9.
 Eching, 139.
 El Mokádah, 2.
 El Mokrán, 3.
 Enarea, 22, 23.
 Enáreans, 3.
 Eudérta, 7.
 Eriasa (Erisos), 146.
 Erisso, 149.
 Evelyn Creek, 112.
 Eyre, 86.
 Eyre Creek, 119.
 Fadassi, 40.
 Famaka, 9.
 Fatsam, 10.
 Fattatenda, 154.
 Ferret, 6.
 Flood Creek, 101, 128.
 Fort Bourke, 101.
 Fort George, 152.
 Fort Grey, 128.
 Fort O'Halloran, 87.
 Foulahs, 153.
 Foulah Tenda, 154.
 Fühshan, 130, 135, 136, 139.
 Gába (Gábba), 27, 49.
 Gáfat, 16.
 Galinier, 6.
 Gambia, 150 to 155.
 Gana, 9.
 Gandjés, 51.
 Gándji, 31.
 Gan-king-foo, 144.
 Gan-hwuy, 144.
 Gebáa (Gibba), 6.
 Gébia, 7.
 Gewésah, 11.
 Gibbe, 27, 44, 55, 58, 59, 61, 62, 63.
 Gibel el Gumara, 11.
 Giesh Mount, 10.
 Gibon, 36, 72.
 Gochob, 46.
 Gódjám, 13, 16, 31.
 Gódjeb, 31, 43, 45, 50, 51, 66, 69.
 Golden Island, 137, 138.
 Góndar, 8.
 Gowin, 46.
 Gúder, 8, 16.
 Gúderu, 16.
 Gúmaro, 49.
 Gutzlaff Island, 131.
 Gwangwe, 8.
 Habáhia, 17, 19, 21.
 Habesh, 2.
 Háik, 82.
 Halfayah, 8.
 Hámasien, 5.
 Hang-chow-foo, 133.
 Hássam, 5.
 Hawásh, 15.
 Héén, 130.
 Herodotus, 146, 147.
 Hessén, 9, 13.
 Ho-chow, 143.
 Hoo-chow-foo, 132.
 Hoo-kow-héén, 144.
 Horro, 16.
 House Islet, 133.
 Hwuy-chow-foo, 132.
 I'fat or E'fat, 16.
 Imperial Canal, 131, 132, 133, 137, 138.
 Isthmus of Mt. Athos, 145 to 149.
 Jamaly Cunda, 150.
 James Fort, 150.
 Jillifree, 150.
 Joloffa, 153.
 Jomard, 17.
 Jookaou, 136.
 Jubb, 46.
 Kaffa, 47, 48.
 Kaba, 7.
 Kambwát, 60.
 Kaou-leang, 138.
 Kaon-min-sze, 138.
 Kayeye Islands, 152.
 Kea-hing-foo, 133.
 Keashan, 136.
 Keying, 131.
 Khartúm, 33, 39, 77.
 Khór el Gash, 4.
 Kiangning, 140.
 Kiang-se, 144.
 Kiang-she, 130.
 Kiang-yin, 136.
 Kidney Bean, 112.
 Kilimaney, 17.
 Kinsan, 137, 138.

- King of Cantabar, 152.
 King of Nyambantang, 152.
 Kin-kwei, 136.
 Konhor, 49.
 Kookwang, 139.
 Kotáda, 48.
 Krapf, 6, 16.
 Kúra, 67.
 Kwachow, 130, 138.
 Kwán-shan, 134.
 Kwanyinmun, 142.
 Kwára, 8.

 Lake Torrens, 97, 101, 115, 116.
 Lalibala, 7.
 Langhorne, 87.
 Lang-shan Creek, 135.
 Lasta, 7.
 Leake, Col., 145, 147, 149.
 Lefebvre, 45.
 Lew-ho, 134, 139.
 Lew-ho-héén, 139.
 Lewis Hill, 100.
 Liberated Africans, 153.
 Lidda, 5.
 Lindoe, Dr., 153.
 Lipson Lake, 122.
 Long drought, 114, 125.
 Lower Coonda Point, 153.

 M'Carthy's Island, 150, 151, 152.
 Macqueen, 12, 28, 44.
 Magnetic Hill, 104.
 Mai Lómi, 7.
 Makádah, 2.
 Malég, 22, 24.
 Mandingoes, 152.
 Mangroves, 151.
 Mans, 15.
 Máreb, 4.
 Márabiete, 15.
 Mason Island, 134.
 Medina, 154.
 Mekyádeh, 2.
 Málka A'bro, 12, 13.
 Málka Kúki, 12.
 Méri, 7.
 Mílli, 15.
 Minandichi, 92.
 Mr. Chown, 150.
 Mogren, 3, 4.
 Mokádah, 2.
 Mómo Moézi, 71, 74, 75.
 Monte Santo, 146.
 Moorundi, 85.
 Moota Point, 150.
 Morpeth Creek, 97, 100.
 Monillane, 146.
 Mountains of the Moon, 11, 51, 52.
 Mount Arden, 115.
 ——— Arrowsmith, 104.
 ——— Dul, 40.

 Mount Poole, 108, 109.
 ——— Robe, 100.
 ——— Serle, 101.
 Múger (Móger), 16.
 Murray, 86, 89.

 Nanking, 132, 140, 141, 142, 143.
 Naso, 31.
 Native huts, 107.
 ——— theft, 90.
 ——— tribes, 116.
 New-to-ho, 143.
 Nile, 1 *ad* 84.
 Nubia, 8.

 O'Halloran, creek, 117.
 Olophyxus, 148.
 'Omar ibn Nedjât, 44, 45.
 Oshko (Ochko), 48.
 Ouelmâl (Walmâl), 17.

 Paez, 14.
 Pang-tuh-héén, 144.
 Paoushan, 131.
 Paoushan Point, 133.
 Paré, 88.
 Piessé's Nob, 93.
 Pipar, 39.
 Pisania, 153.
 Pliny, 148.
 Pococke, 145.
 Point Harvey, 134.
 Pookeu, 143.
 Poole's death, 115.
 Poole's excursion, 91, 98.
 Poyang Lake, 130.
 Preservation Creek, 109.
 Prince de Joinville, 150.
 Pulhidia, 11.

 Ra'ad (Rahad), 8.
 Red Hill, 108.
 Red Hill Creek, 108.
 Red Hill of Casson, 151.
 Rev. W. Fox, 150.
 Rocky Creek, 109.
 Rufus, 57.
 Runka, 88.
 Ruppell, Dr., 4, 5, 77.
 Rusegger, 11, 32, 35.

 Sagarat, 15.
 Sahárte, 6.
 Sáikka, 31.
 Salála, 16.
 Salt Junks, 139.
 Sámien, 7.
 Sandebar, 151.
 Saue, 147.
 Sámela, 7.
 Sawakin, 3.
 Scurvy, 114.

- Se-leang-shan, 143.
 Sennaar, 8, 11.
 Seráwe, 4.
 Shagálu, 7.
 Sha-ho, 134.
 Shanghae, 131, 132.
 Shaou-koo-shan, 144.
 Shaweishan, 130.
 Shay-yang, lake, 136.
 Shémsheho, 7.
 Shimfah, 8.
 Shinasha, 24, 26, 72.
 Shoa, 15.
 Shoabérrie, 69.
 Shoáda, 7.
 Siéka, 47.
 Silver Island, 137.
 Singe, 40.
 Sittit, 4.
 Sobát (Saubat), 39, 40.
 Sodahab, 9.
 Sókota, 7.
 Sononkaya, 154.
 Soo-chow-foo, 132, 134.
 Sor, 49.
 Starling Island, 136.
 Strzelecki Creek, 116, 120, 127.
 Sturt's, Captain, exploration, 85 *ad* 129.
 Sung-kiang-foo, 132.
 Suwákin, 3.

 Taehing, 136.
 Taetsang, 134.
 Tae-tsang-chow, 132, 134.
 Tákkazie, 3, 4, 7, 72.
 Tákui (Blue River), 25, 71, 72.
 Tálba-Wáha, 13.
 Tallow-tree, 144.
 Tamissier, 5.
 Tankerwall, 150.
 Taoutae, 132.
 Ta-tung-chin, 144.
 Tea-plant, 144.
 Téen-shan, lake, 133.
 Tee-pan-yen-sha, 131.
 Tégulet, 15.
 Télla, 7.
 Tebien, 6.
 Terári, 6.
 Theodolite Point, 142.
 Thermometer, 86, 94, 100, 103, 106, 108,
 109, 111, 115.
 Thyssus, 148.
 Tieu-shan, 133.
 Tigre, 5.

 Tínderbar, 151.
 Tis Esát, 15.
 Tsabouhea, 140.
 Tsána, 7, 15, 73.
 Tsélári, 7.
 Tsung-ming, island, 130, 133.
 Tubiri, 68.
 Túmat, 11, 33.
 Tung-chow-foo, 135, 136.
 Tung-leang-shan, 143.
 Tung-lew-héén, 144.
 Tung-ling-héén, 143, 144.

 U'ma (O'mo), 65.
 Uranopolis, 148.

 Vatopidhi, 149.
 Victoria Lake, 87.

 Wág, 7.
 Wálaka, 15, 16.
 Wáldáha, 8.
 Walkáit, 4, 8.
 Wallégga, 31.
 Wánchít, 16.
 Wang-kiang-héén, 144.
 Wáre, 17, 19.
 Wáto, 51.
 Wei-gan-foo, 136.
 Whang-ho, 134.
 Whangpoo, 131, 132, 133, 134.
 White Hill Range, 105.
 Wichi, 49.
 Wódjerat, 7.
 Wófla, 7.
 Woo-hoo-héén, 143.
 Woosung, 131, 132, 134.
 Woo-yang, 136.

 Yabús, 11, 32.
 Yángaroo, 27.
 Yang-chow-foo, 138.
 Yang-tze-kiang, 130 to 145.
 Yanimaroo, 151.
 Yankee, 88.
 Yellow River, 134.
 Yertello, 90.
 Yúbbi, 49.

 Zambéze, 71, 72, 73.
 Zamra, 7.
 Zebé, 57, 63.
 Zigena, 51.
 Zingini, 10.
 Zuwái, 82.

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CONTENTS OF VOL. XVIII.

	PAGE
REPORT of the Council	v
Balance-Sheet for 1847	viii
Estimate for 1848	ix
List of Officers	xi
List of Members, &c.	xiii
Names of Individuals to whom the Royal Premium has been awarded .	xxi
The President's Address on Presenting Medals.	xxiii
Address at the Anniversary Meeting, May 22, 1848, by W. J. HAMILTON, Esq., President	xxxi
Accessions to the Library	lxxiii

ARTICLE

I.—Journal of a Steam Voyage to the North of Baghdád, in April, 1846. By Lieut. J. T. JONES, commanding the Hon. East India Company's Steam-ship 'Nitocris.' Read March 8th, 1847	1
II.—On the best means of reaching the Pole. By Admiral F. WRANGEL. Read April 12th, 1847	19
III.—Note on the Paper of Admiral the Baron Von Wrangel on the best Means of reaching the North Pole. By Sir JOHN BARROW, Bart.	24
IV.—Journal of an Expedition undertaken by the Messrs. Gregory, in the months of August and September, 1846. The party consisting of A. C., F. T., and H. C. GREGORY, four horses and seven weeks' provisions. Read December 13th, 1847	26
V.—Report by Lieut. Helpman, R.N., Commander of Colonial Schooner Champion, on an Expedition to examine Coal discovered on the Irwin River. 1846. Read December 13th, 1847	38
VI.—Memorandum respecting an old Globe (supposed date about 1520) in the Public Library of Frankfort-on-Maine; brought there from a Monastery about sixty years ago. By Mr. H. BLANCHARD	45

ARTICLE	PAGE
VII.—Observations upon M. d'Abbadie's Account of his Discovery of the Sources of the White Nile, and upon certain Objections and Statements in relation thereto, by Dr. Beke. By FREDERICK AYTON, F.R.G.S., and Member of the Geographical Society of Paris. Abridged. Read January 24th and February 14th	48
Note for the purpose of correcting some inaccuracies in the Papers by the Messrs Gregory and Lieut. Helpman. By JOHN ARROWSMITH	74
VIII.—Depression of the Dead Sea and of the Jordan Valley. By Dr. EDWARD ROBINSON, of New York. Read November 22nd, 1847	77
IX.—On the Fall of the Jordan, and of the Principal Rivers in the United Kingdom. By AUGUSTUS PETERMANN. Read February 28th, 1848	89
X.—Expedition to the Jordan and the Dead Sea. By Lieut. MOLYNEUX, of H.M.S. Spartan. Read March 27th, 1848 .	104
XI.—On Eastern Africa. By Lieut. BARKER. Communicated by Mr. M'QUEEN. Read May 8th, 1848	130
XII.—On Eastern Africa. By Lieut. CRUTTENDEN, I.N. Communicated to Mr. M'Queen by Sir WM. HARRIS, Political Resident, Aden. Read May 8th, 1848	136
XIII.—Remarkable Localities on the Coast of Epirus. By JAMES HENRY SKENE. Communicated by Mr. GREENOUGH. Read 12th June, 1848	139

ILLUSTRATIONS.

Part of Western Australia.
 Part of a Terrestrial Globe.
 Part of Eastern Africa.
 Diagram illustrative of the Fall of Rivers.

Royal Geographical Society.

1848.

REPORT OF THE COUNCIL,

READ AT THE ANNIVERSARY MEETING, 22ND MAY.

THE Council have to report that, since the last Anniversary Meeting, there have been elected 8 new Members. Within the same period there have occurred 53 vacancies, of which 21 are by death and 32 by resignation, and the Society now consists of 344 Compounders and 283 Subscribers, besides 39 Honorary and 22 Corresponding Members.

Finance.—The accompanying balance-sheet, made up to the 31st of December, 1847, shows a balance in favour of the Society of 144*l.* 2*s.* 4½*d.*, but there remained unpaid at that date debts amounting to 293*l.* 17*s.* 10*d.*, all of which have, with the exception of one for printing, been subsequently discharged.

Journal.—The Journal during the past year has been published with regularity and distributed to the Fellows free of charge. Although the size of the volume has been reduced, in compliance with the resolutions of the Society adopted last year, the Council have the satisfaction of stating that nothing of importance has been omitted.

Arrears.—The arrears of subscriptions owing to the Society on the 1st of January last, amounted to 422*l.*, a small portion only of which has been since received; this is to be attributed to the circumstance of the majority of those in arrear being out of the kingdom.

Royal Donation.—Of the two gold medals forming the donation of Her Most Gracious Majesty, that called the Patron's

Medal has been awarded to Sir James Brooke (Rajah of Sarawak) for his expedition to Borneo, undertaken at his own risk and expense, with great judgment and after much preparation, as well as for the zeal and perseverance which he has shown during his long residence in Borneo and Celebes, in promoting the progress of geographical discovery directly by his own exertions, and indirectly by the extension of civilization, and the substitution of commerce for lawlessness and piracy; and that called the Founder's Medal to Captain Charles Wilkes, U.S.N., for the talent and perseverance he displayed in a voyage of four years for discovery in the Southern Hemisphere and in the Antarctic regions, the results of which he has given in a splendid and scientific work, published by the Government of the United States.

Library.—The Council having maturely considered the state of the library, as well as that of the large and valuable collection of maps and charts belonging to the Society, alluded to in the report of the Council last year, appointed a Committee to examine and report what measures should be adopted for the purpose of preserving the same and rendering them more accessible to the Fellows generally. That Committee carefully inspected the whole, obtained estimates for binding the unbound volumes, as well as for mounting the maps and charts, and for adding to the library the necessary accommodation by an increased number of shelves. The report of the Committee, having been adopted by the Council, has been circulated amongst the members of the Society, and subscriptions for effecting the proposed measures have been forwarded to the amount of 225*l.* An additional sum, however, of nearly 100*l.* will be required to complete the proposed measures. The Council have resolved to keep this fund separate from the general fund of the Society; if therefore a larger amount should be received than is required at present, it will be retained for this specific purpose.

Accessions.—The accessions to the library during the past year consist of 232 books and pamphlets, and 292 maps and charts, amongst which the Council wish particularly to notice 117 from the Dépôt de la Marine at Paris, many of which are of great value and interest.

In conclusion, the Council have to regret the diminution in the number of members within the past year, but they would observe that circumstances of an unusual character have tended to swell the list ; the great commercial distress, affecting the interests of so large a portion of the community, has led to several resignations, and this will, perhaps, be found to apply not exclusively to the Royal Geographical Society, but to scientific bodies generally. Notwithstanding these circumstances the Council look forward with confidence to a more propitious future, and trust that, by the exercise of proper economy, the funds of the Society will be rendered adequate to its expenditure, and that by the addition of new members it will continue to maintain that high and important position which its objects so justly entitle it to claim.

BALANCE-SHEET FOR 1847.

Dr.

Cr.

	£.	s.	d.		£.	s.	d.
Balance at the Banker's, 1st January, 1847	•	279	8 2	Rent, including the use of Fixtures	•	263	13 0
„ of Petty Cash	•	6	14 3	Salary of Secretary and Editor, one quarter	•	75	0 0
Entrance of 16 new Members, at 3 <i>l</i> .	•	48	0 0	„ Asist. Secretary and Editor, three quarters	•	112	10 0
Compositions of 2 Members, at 25 <i>l</i> .	•	50	0 0	„ Clerk	•	50	0 0
Subscriptions of 226 Members, at 2 <i>l</i> .	•	452	0 0	Collector	•	21	0 0
Arrears	•	26	0 0	Messenger's Wages	•	30	0 0
Overpaid in error	•	2	1 0	Housemaid's do.	•	10	0 0
Dividends on 2378 <i>l</i> . 4 <i>s</i> . 4 <i>d</i> . 3½ per Cent.	•	71	17 8	Firing and Lights	•	18	9 4
„ on 224 <i>l</i> . 1 <i>s</i> . 10 <i>d</i> . Consols (half year)	•	3	5 3	Stationery	•	2	15 4
Royal Premium	•	52	10 0	Freight, Duty, Postages, Carriage of Parcels, &c.	•	21	4 7
Journals sold	•	29	8 6	Evening Meetings	•	4	15 6
Indices sold	•	1	8 0	Insurance and Advertisements	•	5	11 0
Borneo Church Mission, half year's rent	•	15	0 0	Furniture and Repairs	•	15	11 2
				Miscellaneous Printing	•	6	7 6
				Books and Bindings	•	7	0 2½
				Gold Medals	•	46	0 0
				Sundries	•	3	12 10
				Purchase of 224 <i>l</i> . 1 <i>s</i> . 10 <i>d</i> . Consols	•	200	0 0
				Balance at the Banker's	•	136	16 7
				„ Petty Cash	•	7	5 9½
						£1,037	12 10

The above accounts have been compared by us with the corresponding vouchers, and found to be correct.

24th February, 1848.

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- *Herbert, the Hon. Sidney
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F.R.S., F.L.S.
King, Major Edward, 36th Regt.

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Llandaff, Bishop of
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390 *Manackjee, Cursetjee, Esq.

VOL. XVIII.

- Manchester, the Lord Bishop of
*Mangles, Captain, R.N., F.R.S.
*Marjoribanks, Edward, Esq.
*Markham, Edward, Esq.
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Maughan, Captain P., Ind. Navy
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F.G.S.
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*Monteagle, the Right Hon. the Lord
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Mundy, Capt. G. R., R.N.
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 F.R.S.
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 &c.
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 R.N., D.C.L., F.R.S.
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 F.R.S., C.B.
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 R.N., K.C.H., F.R.S.
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 F.R.S., S.A., L.S., G.S., &c.
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 F.L.S., F.G.S., M.R.I.A.
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 K.C.B.
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 M.P.
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 L.S.
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 F.R.S.
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G.S. Worthington, the Rev. Dr. 620 Wray, John, Esq. *Wyld, James, Esq., M.P. <p style="text-align: center;">Y.</p> <ul style="list-style-type: none"> Yates, John Ashton, Esq. *Young, George F., Esq., M.P. *Young, James, Esq. Young, Charles Baring, Esq. 627*Yorke, Lieut.-Colonel |
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NAMES OF INDIVIDUALS TO WHOM THE ROYAL PREMIUM HAS BEEN AWARDED.

- 1831.—Mr. RICHARD LANDER, for the discovery of the course of the River Niger or Quorra, and its outlet in the Gulf of Benin, in Central Africa.
- 1832.—Mr. JOHN BISCOE, for the discovery of the land now named "Enderby's Land" and "Graham's Land," in the Antarctic Ocean.
- 1833.—Captain Sir JOHN ROSS, R.N., for discovery in the Arctic Regions of America.
- 1834.—Major Sir A. BURNES, C.B., F.R.S., for the navigation of the River Indus, and a journey by Balkh and Bokhara across Central Asia.
- 1835.—Captain Sir GEORGE BACK, R.N., for the discovery of the Great Fish River, and navigating it to the sea on the Arctic Coast of America.
- 1836.—Captain ROBERT FITZROY, R.N., for the survey of the shores of Patagonia, Chile, and Peru, in South America.
- 1837.—Colonel CHESNEY, R.A., F.R.S., for the general conduct of the "Euphrates Expedition" in 1835-6, and for the accessions to comparative and physical geography relating to the countries of Northern Syria, Mesopotamia, and the Delta of Susiana.
- 1838.—Mr. THOMAS SIMPSON, [Founder's Medal,] for the discovery and tracing, in 1837 and 1838, of about 300 miles of the Arctic shores of America.
- Dr. EDWARD RÜPPELL, [Patron's Medal,] for his travels and researches in Nubia, Kordofán, Arabia, and Abyssinia.
- 1839.—Mr. R. H. SCHOMBURGK, [Patron's Medal,] for his travels and researches during the years 1835-9 in the colony of British Guayana, and in the adjacent parts of South America.
- Major H. C. RAWLINSON, E.I.C., [Founder's Medal,] for his travels and researches in Susiana and Persian Kurdistan, and for the light thrown by him on the comparative geography of Western Asia.

- 1840.—Lieut. RAPER, R.N., [Founder's Medal,] for the publication of his work on "Navigation and Nautical Astronomy."
- Lieut. JOHN WOOD, I.N., [Patron's Medal,] for his survey of the Indus, and re-discovery of the source of the River Oxus.
- 1841.—Captain JAMES CLARK ROSS, R.N., [Founder's Medal,] for his discoveries in the Antarctic Ocean.
- Rev. Dr. E. ROBINSON, of New York, [Patron's Medal,] for his work entitled "Biblical Researches in Palestine."
- 1842.—Mr. EDWARD JOHN EYRE, [Founder's Medal,] for his explorations in Australia.
- Lieut. J. F. A. SYMONDS, [Patron's Medal,] for his survey in Palestine and levels across the country to the Dead Sea.
- 1843.—Mr. W. J. HAMILTON, M.P., [Founder's Medal,] for his researches in Asia Minor.
- Prof. ADOLPH ERMANN, [Patron's Medal,] for his extensive geographical labours.
- 1844.—M. CHARLES RITTER, [Gold Medal,] for his important geographical works.
- Dr. BEKE, [Founder's Medal,] for his extensive explorations in Abyssinia.
- 1845.—Count P. E. DE STRZELECKI, [Founder's Medal,] for his extensive explorations and discoveries in the South-Eastern portion of Australia, and in Van Diemen's Land; and for his valuable work, in which he has consigned the results of his observations.
- Professor A. TH. MIDDENDORFF, [Patron's Medal,] for his extensive explorations and discoveries in Northern and Eastern Siberia.
- 1846.—Captain CHARLES STURT, [Founder's Medal,] for his various and extensive explorations in Australia.
- Dr. LUDWIG LEICHHARDT, [Patron's Medal,] for a journey performed from Morton Bay to Port Essington.
- 1847.—Captain CHARLES WILKES, U.S.N., [Founder's Medal,] for his Voyage of Discovery in the S. Hemisphere and in the Antarctic Regions, in the years 1838–42, and for the volumes which he has published, detailing the narrative of that expedition.
- Sir JAMES BROOKE, Rajah of Sarāwak and Governor of Labuan, [Patron's Medal,] for his Expedition to Borneo.

PRESENTATION
OF THE
GOLD MEDALS,

AWARDED RESPECTIVELY TO CAPTAIN WILKES, U.S.N., AND
SIR JAMES BROOKE.

THE President, Mr. W. J. Hamilton, thus addressed the Meeting:—

“Gentlemen,—You have just heard the announcement that the Council has awarded the Founder’s Medal to Captain Wilkes, of the United States Navy, for the zeal and intelligence with which he carried out the scientific exploring expedition intrusted to him by the Government of the United States in the years 1838–1842; and for the volumes which he has published, detailing the narrative of that expedition.

“It therefore becomes my duty to endeavour to give you some account of the performances of the gallant officer, and of the services which he has rendered to the progress of geography. It must be remembered that this was the first expedition ever fitted out by the Government of the United States for scientific purposes. Greater difficulties must, therefore, be supposed to have attended its organization than would have been the case with more experience; on the other hand, the merit of success is proportionally increased.

“The expedition left the Hampton Roads on the 17th of August, 1838, and its first scientific operation was the establishment of an observatory at Orange Harbour, in Terra del Fuego; here some of the vessels remained while others were detached to the westward, and Captain Wilkes himself proceeded on the 25th of February to the S., for the purpose of exploring the S.E. side of Palmer’s Land. After reaching lat. 63° 25’ S., finding the season too far advanced to make any progress against the ice, he turned his ship’s head to the N., and the whole squadron was soon collected at Valparaiso. Here another observatory was established. A scientific party visited the bank of snow from which the city is supplied, on one of the outlying ranges of the Cordilleras, the principal heights of which rose nearly 4000 feet above them; others visited the mines of Chili. They then proceeded to the coasts of Peru, and thence, after a visit to the interior and to the ruins of Pachacamac, commenced their explorations in the Pacific.

“The Paumotu group of islands was first visited, for the purpose of completing its examination as recommended by Admiral Krusenstern,

and in the hope of settling the disputed point between the two distinguished English and French navigators, Captains Beechey and Duperrey, as to the geographical position of the island of Minerva or Clermont de Tonnerre; Captain Wilkes considers the statement of Captain Duperrey the most correct. After visiting Tahiti and the Samoan Group, respecting all of which Captain Wilkes' details are full of information, he proceeded to Sydney to refit before starting on his Antarctic cruise.

"On the 26th of December, 1839, they left Sydney, and first fell in with the ice on the 10th of January, 1840, in lat. $61^{\circ} 8' S.$, and long. $162^{\circ} 32' E.$; and on the 11th some of the officers were confident they saw indications of land. Captain Wilkes does not rely much on this; but on the 16th these appearances became more positive, and on the 19th they distinctly saw land in long. $154^{\circ} 30' E.$, lat. $66^{\circ} 20' S.$ Captain Wilkes, however, only dates the discovery which he claims for his expedition from the land seen on the 16th. I mention this the more anxiously on this occasion, on account of the controversy which has arisen between him and Sir James Ross, who sailed over the spot where land was supposed to have been seen on the 11th; to this, however, I wish to allude as lightly as possible, convinced as I am that both these gallant officers have only been anxious to establish the truth, and to advance the cause of science. Undoubtedly, on the tracing which Captain Wilkes furnished to Sir James Ross, the land supposed to have been seen on the 11th of January is sketched in, and, as a measure of precaution, it was perhaps prudent in Captain Wilkes so to do; it would have been more satisfactory if he could have stated to Sir James Ross, as he has done in his published account, on what slight and imperfect evidence its existence in that position was laid down. After continuing his explorations of the Antarctic continent as far to the westward as long. $97^{\circ} E.$, Captain Wilkes, finding his provisions short, and the season far advanced, turned his ship's head to the N. and quitted these frozen latitudes. I cannot take leave of this portion of the narrative of Captain Wilkes without alluding to the high encomiums passed on his proceedings by Sir James Ross, who observes that 'the arduous and persevering exertions of this expedition, continued throughout a period of more than six weeks under circumstances of great peril and hardship, cannot fail to reflect the highest credit on those engaged in the enterprise, and excite the admiration of all who are in the smallest degree acquainted with the laborious and difficult nature of an icy navigation:' he adds, 'that as yet they had not received the reward or approbation they merited.'

"But I cannot dwell longer on the details of this interesting expedition. They subsequently proceeded to New Zealand, thence to the Feejee group of islands, where an observatory was established on Ovalau, and many interesting facts ascertained respecting the habits and manners of the natives, and the geographical features of the group. Hence they proceeded to examine the Hawaiian group, or Sandwich Islands, where we have an interesting account of the ascent of Mauna Loa and the Volcano of Kilauea. Thence stretching across to the American continent, they surveyed a portion of the coast of

California. Again crossing the whole extent of the Pacific, they visited and examined the Philippine Islands; and passing through the Sooloo Archipelago, proceeded to Singapore, and finally returned to America, touching at the Cape of Good Hope. I regret that it is impossible, within the limits of this address, to do justice to the contents of the five volumes in which Captain Wilkes has described the progress of the expedition; but I trust I have done enough to show that the exertions of Captain Wilkes, and the result of the expedition intrusted to him, have in every respect been such as to entitle him to the highest mark of distinction which it is in the power of this Society to bestow."

The President, now addressing himself to Mr. Bancroft, said—

"MR. BANCROFT,—In addressing you for the purpose of placing in your hands the medal which has been awarded by the Council of the Royal Geographical Society of London to your distinguished countryman, Captain Wilkes, for the valuable work which he has published under the title of the '*United States Exploring Expedition*,' I rejoice in being the organ of expressing to you the sentiments entertained on this side of the Atlantic of the merits of Captain Wilkes. This is the second occasion on which our medal has been awarded to one of our Transatlantic brothers, and I feel no small gratification in being thus enabled to give to the whole civilized world this additional proof that the pursuit of science operates as a powerful inducement in knitting the bonds of friendship still more closely together between the two great nations of the Anglo-Saxon race. May this union long exist, and may they in their continued harmony and good-fellowship continue to point out by their enlightened institutions the value of that sound practical common sense for which they are both so pre-eminently distinguished. May I request you to convey this medal to Captain Wilkes, with the expression of the best wishes of the Royal Geographical Society of London for his future prosperity and success."

The American Minister replied as follows:—

"MR. PRESIDENT,—I have the greatest satisfaction in receiving on behalf of Commander Wilkes, of the United States Navy, the Founder's Medal awarded to him by the Royal Geographical Society. An Englishman discovered North America, and England has made the paths of the wilderness as familiar as accustomed haunts, and traced the currents of the ocean almost as carefully as the courses of her rivers. To obtain, therefore, from the body representing English geographical science this most honourable testimonial to the merits of an American expedition, is in every way grateful.

"Let me add my thanks for the affectionate words in regard to my country in its relation with your own. Every kindly wish of that nature uttered here has its response beyond the Atlantic; and on this occasion I will express the hope, that when the remote regions which our navigators have revealed or explored become enlivened by the colonies of civilized man, when the great ocean which so long remained

a solitude is rendered social by the peaceful fleets of commerce, your countrymen and mine may never meet but in friendship.

"I shall immediately transmit this medal to Commander Wilkes, who graces a patriotic zeal in his profession by the successful culture of science."

PATRON'S MEDAL.

The President then proceeding, observed—

"It has already been announced that the Council have awarded the Patron's Gold Medal to Sir James Brooke, the Rajah of Sarawak and Governor of Labuan.

"The name of Mr. Brooke has been so frequently and honourably brought before the public in the course of the past winter, that it is almost unnecessary for me to occupy your time in detailing at any length the motives which have led the Council to make their present award. But I should be failing in my duty to this Society, to my distinguished friend, and, lastly, to myself, were I on the present occasion to omit all mention of the honourable and gallant deeds of our absent associate. When a very young man Mr. Brooke went to India as a cadet, and was distinguished for his gallantry in the Burmese war. Being wounded on that occasion, he left Calcutta for China in 1830, for the benefit of his health. During this voyage he first saw and was struck with the islands of the Asiatic Archipelago. Although hitherto neglected and scarcely known, Mr. Brooke soon became convinced that they offered a splendid field for enterprise and research. Henceforth, to carry civilization to the Malay races, to extend to them the benefits of commerce, and to open to us additional geographical knowledge, became the objects to which he determined to devote his energies and his means. Soon after his return to Calcutta he quitted the Indian service, and, full of zeal for his contemplated work, proceeded to England, working his way home before the mast, in order to acquire a practical knowledge of those duties and of that science to which henceforth he must trust so much.

"He then became the owner of the Royalist yacht, and spent a twelvemonth cruising in the Mediterranean, trying his vessel and training his crew. During this time he prepared a short memoir on the Gulf of Syme, not yet surveyed by our Navy, and which was published in the eighth volume of our Journal.

"He sailed from England on his gallant yet hazardous adventure on the 27th of October, 1838, and on the 1st of August, 1839, dropped his anchor off the coast of Borneo, near Tanjong Api. After visiting Sarawak, exploring some of the rivers along the coast, and putting himself in communication with the Rajah, Muda Hassim, during which time he had become deeply interested in the future fortunes of Sarawak, Mr. Brooke returned to Singapore, and determined on an excursion to Celebes during the probable continuance of the civil war in Borneo. To this visit to Celebes we are indebted for much information respecting the geography of the Gulf of Boni, a chart of which was prepared under the immediate eye of Mr. Brooke, who has also

given us, for the first time, the history of the great independent kingdoms of this fine island, whose princes are said to be desirous of forming commercial relations with the English nation.

"After his return to Sarāwak in August, 1840, struck with the miserable condition of a fine country and a fine people, Mr. Brooke entered into arrangements with the Rajah, Muda Hassim, which terminated in the discomfiture of the rebels, and finally in the cession of Sarāwak to Mr. Brooke, and of the island of Labuan to the British Government. For the details of the gallant enterprises by which these measures were brought about, I must refer you to the interesting volumes of Captain Keppel, and to those still more recently published, in which the full success of Mr. Brooke's plans has been developed, by my gallant friend Captain Mundy.

"In these will be seen the advantages gained to geographical science by the introduction of civilization and commerce amongst the Malays and Dyaks of Borneo. Many of the rivers of that island, admitting our steamers and men-of-war far into the heart of the country, were surveyed and examined, first by Mr. Brooke, and subsequently by the commanders of the different vessels who were induced to visit the coasts of Borneo, either from Mr. Brooke's representations, or in the exercise of duty for the purpose of putting down the lawless system of piracy and murder which had long prevailed on those inhospitable shores. By them the coasts have been still more accurately surveyed and laid down, but to Mr., now Sir J., Brooke will ever remain the credit and the praise of having, from his own energies and resources, evolved a plan of conduct, founded on the most enterprising and philanthropic views, which has led to such a vast increase of our geographical knowledge, and to the introduction of lawful commerce and enlightened civilization in regions hitherto known only by the kris of the Malay and the atrocious narratives of rapine, piracy, and murder.

"Captain MUNDY,—It is with the liveliest satisfaction that I request you to be the means of forwarding this medal to our mutual friend. It recalls to my memory those days when, myself a traveller on the classic shores of Ionia, I first became acquainted with yourself, and subsequently with Mr. Brooke in the Gulf of Smyrna. You will not fail to remind Sir J. Brooke of the warm interest entertained by the Royal Geographical Society for his success, and of the pleasure they have felt in conferring on him this mark of their admiration and esteem."

Captain Rodney Mundy rising, replied—

"Mr. PRESIDENT,—I can assure you that I receive with great satisfaction the Patron's Gold Medal which has been awarded by the Council of the Royal Geographical Society to Sir James Brooke, and, according to your request, I will take the earliest opportunity of forwarding it to him, either at the seat of his own native government in the province of Sarāwak, or at the seat of the government which he holds under the authority of our Gracious Majesty at the Island of Labuan. And now I should wish at once to convey to you my thanks for the kind and complimentary manner in which you have been

pleased to allude to me individually, when first we became acquainted on the shores of Ionia, and also as connected with Sir James Brooke's exertions in promoting the extension of geographical knowledge in the Indian Archipelago. I also am desirous of expressing how gratified I feel at having been invited to attend here to-day, as the representative of my friend the Rajah of Sarāwak, on this interesting and important occasion.

"It was my good fortune to be much associated with that great man during the last two years of his unequalled career in the East; it was also my good fortune to be selected by Rear-Admiral Sir Thomas Cochrane, the Commander-in-Chief in the Indian Seas, to take possession, in the name of The Queen, of the Island of Labuan, over which Sir James Brooke now rules; an island which, though small and insignificant in itself, yet, from its position at the mouth of the river on which stands the capital of Borneo Proper; from its excellent harbour; from the large vein of coal which it contains in its bosom, and from other local circumstances, will, we may reasonably anticipate, ere many years pass over, form a valuable commercial establishment in that quarter of the globe. From that island, as a general centre, we may also predict that many expeditions will shortly set forth with the grand object of extending our geographical and geological knowledge of the neighbouring countries, and, under the guidance of the master mind of its founder and governor, we may surely look forward to the happiest results, and thus, by imperceptible advances, make ourselves acquainted with much that will be valuable to science in general.

"Mr. President, feeling enthusiastically as I do every thing connected with Sir James Brooke, it is difficult for me to resist the temptation, which the opportunity of speaking now offers me, of dwelling at some length on the many and great services performed by my distinguished friend for the benefit of his country and for the advancement of civilization; but I feel that it would be out of my province to do more on this occasion than express my admiration of the able and correct statement which you have yourself just given of the general character of Sir James Brooke's mission to Celebes and Borneo. As connected with the object for which I am here to-day, I may also state that I was engaged with Sir James Brooke in all those extensive operations which terminated in the total expulsion of the pirate communities from the N.W. coast of Borneo, and which placed the seaboard of that magnificent island in a state of security; the practical result of which has been, that on the same ground where, only two years since, that zealous officer Sir Edward Belcher met with every obstacle, and was obliged to hurry from station to station at the risk of the loss of his instruments and even of his life, there is now not only no opposition from the natives, but even a desire to afford every assistance to the officer employed on surveying duty in that quarter.

"It now only remains for me to add, that in frequent conversations held with Sir James Brooke, I have ever heard him express himself in terms of warmth and anxiety for the extension of geographical knowledge in the Indian Archipelago; indeed, with the exception of the

two leading and animating passions of his mind (if I may so express myself), namely, the gradual civilization of our semi-barbarous brethren in those seas, and the opening of a new field for the commercial enterprise of his own great country, the progress of geographical discovery has been one of the grand ideas which occupied him from the commencement of his hazardous voyage, and which he cherished with the same enthusiasm which has marked every other act of his extraordinary life.

“ You will then, Mr. President, easily comprehend how gratified Sir James Brooke will be when he receives this testimony of the feelings of this distinguished Society towards him. He will, I am assured, receive this valuable token of the estimation in which his services have been held by this Society with every sentiment of gratitude. It will be a proof to him, that although his labours have been carried on at the distance of half the globe, those labours on behalf of science have not been in vain; he will know that the eye of a small but scientific body of his fellow-countrymen has been anxiously watching his proceedings through the many years of his voluntary exile, and, at the proper time and season, have offered to him the greatest reward it is in their power to bestow.

“ This gift will, indeed, be an earnest and still further encouragement to Sir James Brooke to continue those services so long as Providence continues to him the blessing of health, and the Patron's Gold Medal will, I am satisfied, ever remain in his family as a memorial of the honour now conferred on him by the Council of the Royal Geographical Society.”

ADDRESS

TO THE

ROYAL GEOGRAPHICAL SOCIETY OF LONDON;

Delivered at the Anniversary Meeting on the 22nd May, 1848,

BY W. J. HAMILTON, Esq.,
PRESIDENT.

GENTLEMEN,—In conformity with the practice now for some years established by my predecessors in this Chair, I proceed to lay before you a statement of the progress made in geographical knowledge during the past year. And although it may, perhaps, appear that the results have hardly equalled our expectations, and that the amount of geographical discovery falls short, in some respects at least, of that made during former periods, I think you will agree with me when I say, that much has been done both by our own countrymen and by foreigners to mark the epoch we are now celebrating as one not altogether devoid of interest or novelty, and as one which will add fresh laurels to those who have already distinguished themselves in a career in which they may be justly called the pioneers of an enlightened civilization.

But before proceeding to those matters which form the main feature of my task, I must detain you for a short time, while I refer to those amongst our associates whose loss we have to lament, who have more particularly distinguished themselves by their exertions in the field, or their less active but not less meritorious investigations in the closet.

OBITUARY.

We have to lament the loss of three distinguished foreign honorary members of our Society—Count Gräberg of Hemsö, Major-General Visconti, and Professor Magnussen of Copenhagen. In the two former we have, I regret to say, lost two of our most valued and useful correspondents. From them we were in the habit of regularly receiving the most correct and detailed information of the progress of

our science, or of whatever related to it, from Florence and from Naples.

Count James Gråberg de Hemsö was born at Gannarfve, in the Swedish island of Gothland, the 7th of May, 1776. After receiving an excellent education from his father, President of the Court of Appeal in Gothland, he entered the merchant service at the age of 16, and visited England, Portugal and America. In the year 1793 he served on board a British man-of-war, and in 1794 commanded a gun-boat at the capture of the fort of Calvi in Corsica. When about to obtain the rank of Lieutenant he was obliged, in consequence of a duel, to leave the service, and retired to Genoa. In 1800 he was attached to the Swedish Legation, in Italy, as Private Secretary to M. de Lagerswård, and devoted himself to his favourite studies of statistics, mediæval history, ethnography, and philology. He then became Swedish Vice-Consul at Genoa, and in 1815 was appointed Secretary to the Consulate at Tangiers. In 1822 he was compelled to fly from Tangiers, and to take refuge in Gibraltar; in 1823 the King of Sweden named him Consul at Tripoli, but not meeting with the support he expected from his own Government, he obtained permission, in 1828, to retire from his post and to reside in Florence, where he had remained since that period, devoting his time to the pursuit of his favourite studies, amassing a valuable and extensive library, and writing memoirs on the different subjects connected with his studies. A catalogue of his works, published in 1837, thus enumerates 112 distinct performances:—Works printed separately, 27; poetical works, 8; academical memoirs, 15; articles in periodicals and journals, 62. These were written in no less than eight different languages, viz., Italian 76, French 24, English 4, Latin 3, Swedish 2, German, Portuguese, and Arabic, 1 each. Amongst these numerous works I may mention his '*Annali di Geografia e di Statistica*,' full of useful and curious information, and his '*Specchio del imperio di Marocco*,' the result of a residence of six years at Tangiers. Many papers by him are to be found in the '*Memoirs of the Geographical Society of Paris*,' and in the seventh volume of our own Journal is an interesting communication from him, with a vocabulary of names of places, &c. in the empire of Marocco.

General Ferdinand Visconti was born at Palermo in 1772. Whilst still at the military college he was arrested and confined, without any accusation, in the dungeons of Pantellaria. Although liberated in 1801, he was obliged to fly to Milan, where he entered the corps of engineers, and rapidly distinguished himself. He was charged by the Emperor Napoleon with the construction of a new large military and

administrative map of Lombardy. The materials placed at his disposal were so imperfect that he was compelled to begin by fixing for himself the latitudes and longitudes of numerous places. In 1810 he accompanied General Danthouard into Tyrol, to fix the boundaries between Bavaria and the kingdom of Italy. In 1814 he returned to Naples, where he was placed at the head of the Bureau Topographique, which he soon placed on a sound scientific footing, and on the return of Ferdinand IV. from Sicily was confirmed in his office. In 1820 he was nominated by the Hereditary Prince to the Provisional Junta of the Constitutional Government. On the return of the King with the Austrians, he resumed his office of Director of the Bureau Topographique, but was dismissed in 1822, being subsequently restored in 1826, after several years' residence in France and other countries. His principal works were the map of the kingdom of Italy, already mentioned, in 7 sheets, a hydrographical map of the Adriatic in 22 sheets (a work of great merit), and subsequently the topographical map of the environs of Naples, besides several others commenced before he was dismissed in 1822.

Professor Magnussen, of Copenhagen, was well known as the President for many years of the Society of Northern Antiquaries.

Amongst our own countrymen our losses have been unusually numerous. Even within the last few days we have to lament the loss of Lord Ashburton, who, although not distinguished as a geographical writer, will ever be remembered for having settled the most important geographical question of modern days—a question respecting which every public and private depository of maps and charts was ransacked for information, and on the solution of which the peace of nations was at one time supposed to hang. I need not say that I allude to the question of the boundary between the Canadian possessions of Great Britain and the United States.

We have also to deplore the loss of the Earl of Powis, the Marquess of Bute, Admiral Sir Robert Stopford, Sir James Annesley, Colonel Barnewell, Colonel Brandreth, a member of the Council of this Society, Captain Shirreff, and many others.

Amongst the really practical men of whose services we have been deprived, I must particularly notice Lieut.-Colonel Henry R. Brandreth, who had only recently been elected a member of our Council. He was born in 1794, and, after receiving an excellent military education, was employed, on receiving his commission, in the Engineers at Chatham, and in the survey of England. He was afterwards actively employed on foreign service for many years. In 1825 he was appointed by the Duke of Wellington to erect iron barracks in some of the West Indies.

In 1829 his employment under the Admiralty began. During the subsequent years he served as a Commissioner under the Reform Boundary Act and the Municipal Corporations Act, and on various other important services. In 1836 he was appointed Director of the Architectural and Engineering Works of the Admiralty. This office he held for ten years, to the great benefit of the public service, and received a letter of thanks from the Board of Admiralty, when, in 1846, he was appointed to a seat in the new Government department called 'the Railway Board,' which he held until the period of his death. He has left some very valuable papers respecting most of our colonial possessions, in which he was employed at various times.

Sir Grenville Temple was well known for his geographical and antiquarian researches in the Mediterranean, and especially on the coast of Africa. In 1835 he published a small work, in which he has recorded the results of his investigations.

Sir James Annesley was a physician of some celebrity in the East India Company's service. He published some valuable works on the botany of India, and on the diseases of tropical climates.

Mr. W. Wittich was another of our members whom we have lost. Amongst other works which he has published I may mention his series of the 'Curiosities of Physical Geography,' in which he has described some of those natural phenomena which characterise particular portions of the earth's surface, such as icebergs, glaciers, trade-winds, monsoons, deserts, &c. These volumes were published in 1845. He was also the author of a work on Canada conjointly with Mr. G. Long, and contributed many, if not most, of the articles on geography to the 'Penny Cyclopædia.'

We have also to record the loss of Captain Grover, one of the most zealous promoters of the chivalrous enterprise of the Rev. Dr. Wolfe to Bokhara to investigate the fate of two gallant officers. The investigation, it is well known, terminated in the conviction of their assassination by the orders of a barbarous chieftain. But Captain Grover's efforts in the cause of humanity are not the less deserving of our admiration, and of being recorded as one of the most meritorious acts in the life of the gallant officer.

Mr. Hatchett was a Fellow of the Royal Society, and a distinguished chemist. For many years he was an intimate friend of Sir Humphry Davy, and many of his memoirs have been published in the 'Philosophical Transactions.'

OUR OWN LABOURS.

In noticing the communications which have been read at our evening meetings during the past season, it will be unnecessary for me to detain you long, as many of them will be published in the ensuing number of the Journal, which I trust will soon be ready for distribution amongst the members of the Society.

The remarkable features of the country surrounding the Dead Sea, and the still more remarkable depression of the surface of its waters below the level of the Mediterranean, could not fail to attract the attention of Dr. Robinson, the author of '*Biblical Researches in the East*,' who, arguing on the strength of certain data which he assumed to be correct, and which, it is but fair to state, he derived from the Journals of this Society, has, in a paper lately read before the Society, expressed his doubts as to the conclusions to which the scientific travellers who have lately visited that country have come; but it would appear, that instead of questioning the fact of the depression of the Dead Sea, the data on which he had relied were incorrect. In the first place, he has assumed that the statement that the Lake of Tiberias is only 328 feet below the Mediterranean is correct; and, secondly, that the distance between the points where the Jordan leaves the Lake of Tiberias, and where it enters the Dead Sea, is only 60 miles. These facts, if correct, would certainly give a fall of about 16 feet in every mile of its course. This is the principal point on which Dr. Robinson founds his objection to the assumed depression of the Dead Sea. The fact, however, is, according to the most authentic measurements, viz., those of Dr. Russegger and of M. von Wildenbruch, the Prussian Consul, that the depression of the Lake of Tiberias is much more considerable than has yet been supposed, being, according to the former, 625 French feet, and, according to the latter, 793 feet below the Mediterranean. Again, the distance between these two points is, according to Russegger, 20 German geographical miles, equal to 80 English, or upwards of 90 statute miles. Thus, according to these corrections alone, the fall of the Jordan between the two lakes is not more than 8 feet per mile; an amount of inclination really small when the nature of its bed is considered.

But on this subject we have had another paper by Mr. Petermann, a fellow of this Society, who, bringing to bear the information he has obtained in his hydrographical pursuits, respecting the average fall and inclination of rivers in the United Kingdom, has shown, in his paper on the fall of the Jordan and other rivers, that such a fall of 8 feet, or even more, is by no means unusual even in this country.

The fall of the Tweed in Roxburghshire and Berwickshire, during 53 miles of its middle course, exceeds $9\frac{1}{2}$ feet per mile, and during the last 80 miles of its course, viz., from its confluence with Biggar Water to the sea, it has a fall of 605 feet, or nearly 8 feet per mile; and yet throughout this distance it has neither waterfalls, cataracts, nor rapids to prevent the navigation of small boats. Mr. Petermann's paper is full of information respecting the fall of rivers and the conditions influencing their fall. He also shows how deceptively the length of the course of a river is diminished in maps on a small scale.

Rear-Admiral Sir Francis Beaufort has communicated to us an interesting paper, drawn up by the late Lieutenant Molyneux, of H.M.S. *Spartan* (forwarded to him by Captain Symonds, commanding that vessel, and by whom the expedition of Lieutenant Molyneux was set on foot), giving a full account of the journey undertaken by him for the purpose of sounding the Lake of Tiberias and the Dead Sea, and of exploring the intervening portion of the valley of the Jordan. His account of the valley between the two lakes bears directly on the question of the fall of the Jordan, although he was unable to complete the inquiry in consequence of his boat having been attacked and plundered by the Arabs. It is evident, however, from his account of the winding nature of the river-bed, the shallows with which the boat had to contend, and the many weirs over which it had to be carried, that the fall must have been very considerable during the first portion of the voyage. In one place, soon after entering the Jordan, we are told that for 7 hours there was not water to float the little dingy for 100 yards together. On another occasion he says, "There are in the upper part of the river many *hundreds* of places where you might walk over, without wetting your feet, on large rocks and stones." As therefore the now corrected data only give a fall of 8 feet per mile, we may, I think, safely credit the statement that the depression of the Dead Sea is, as has been stated, at least 1340 feet below the Mediterranean. Lieutenant Molyneux does not appear to have made any observations on this point. The other portion of Lieutenant Molyneux's paper gives an account of his proceedings in sounding the Dead Sea, in which, notwithstanding his difficulties and the absence of his English sailors, he succeeded in getting three casts with his deep-sea lead, in those places which appeared to him to be the deepest portions of the lake. These casts were as follows—225, 178, and 183 fathoms. The Lake of Tiberias is comparatively shallow, the deepest soundings not exceeding 20 to 26 fathoms. I regret to have to state that this gallant officer died, soon after his return to his ship, from the combined effects of climate and over-exertion.

Two communications have been read respecting the discovery of coal on the western shores of Australia, about 4° N. of Perth and the Swan River. The first of these is an account of an expedition undertaken by Messrs. Gregory, for the purpose of examining the country to the E. and N. of Toodgay, and of ascertaining the general trend of the waters to the eastward of Lake Brown. They succeeded after a long journey in discovering two good seams of coal in the bed of what they supposed to be the river Irwin. The second is an account by Lieutenant Helpman, R.N., commanding the colonial schooner *Champion*, of an expedition to examine this coal, of which they brought away several cwt. He discovered a snug harbour protected by a natural pier of coral, very useful for small coasting vessels, which was named Port Grey; it is near the mouth of the river Chapman and Champion Bay.

Subsequent investigations seem to point out an error in the nomenclature of the rivers, and other positions on this coast, and to show that in fact the river called the Irwin in these communications, is really the Arrowsmith. This error seems to have been occasioned by the Messrs. Gregory finding a river in the same latitude as that in which the Irwin was placed by Captain Grey, on his rapid journey after being wrecked in Gantheaume Bay, when he exaggerated his distances in the first part of his journey, bringing all the rivers too far S. All these points will be made clear in the new map of the western coast of Australia, about to be published by Mr. J. Arrowsmith.

A memoir by Mr. Duncan has also been read, detailing his journey from Abomey, in the kingdom of Dahomey, to Adafoodiah, in the interior. The substance of this paper has been incorporated in the work published by Mr. Duncan, which I shall hereafter mention.

From another of our members, Mr. F. Ayrton, we have had an interesting paper, entitled 'Observations upon M. d'Abbadie's Account of his Discoveries of the Sources of the White Nile, and on certain Statements and Objections by Dr. Beke.' In this paper, which I trust will be shortly printed in our Journal, the author endeavours to show that there is more probability of correctness in the statement of M. d'Abbadie as to the position of the sources of the White Nile, than in the assumption of Dr. Beke that they are to be looked for two or more degrees to the S. of the Equator. This position the author endeavours to prove by several arguments drawn from the physical character of the country, its history, and its nomenclature. He points out that the Mountains of the Moon, *σεληνης ορος*, in which, according to Ptolemy's account, the White Nile rises, are the Gebel el Qamar of Arabian geographers, and he identifies this name of Qamar, Qomr, or

Qomri, &c., with Gamaro, the name of the district of Abessinia in which, according to M. d'Abbadie, the Nile rises. He shows satisfactorily, from the nature of the trade in ancient times and its distribution between Arabs and Greeks, that the Greeks would naturally obtain their information respecting inland parts of Abessinia, then lately conquered by the Arabs, from the Arabs themselves. Again, arguing from the facts that owing to the rise and inclination of the river the chief source of the White Nile must be amidst high mountains, and that the clouds and moisture brought up by the S.W. monsoon are condensed on the high mountains of Inarya and Kaffa, he shows that there cannot exist S. of these mountains any loftier range, because, if so, it would have intercepted the moisture and rain of the monsoon; and he further shows that, as in a tropical climate, no great river could take its origin except amidst a lofty mountain range, we have no authority for looking for the sources of the Nile in a district where it is shown no elevated mountains can exist.

You have also lately heard read a memoir by Mr. Leigh, giving an account of a visit to the river Zambesi, on the eastern coast of Africa. The author gives an animated description of the town of Quilimane and the habits and manners of the inhabitants, a mixture of negro and Portuguese, apparently very favourable to the encouragement of the slave trade; he also describes the scenery of the neighbourhood and the low banks of the marshy sluggish river.

Mr. M'Queen has lately communicated three papers to the Society. One is an itinerary by a Moorish merchant, named Hamed Essagheen, who had travelled seven times from Tripoli to Kano, detailing a caravan route from Ghraat to Kano, which had occupied 67 days. Mr. M'Queen considers this itinerary very valuable, as fixing the position of several important places in this part of Africa, explaining doubts and correcting errors. The other two communications were by Lieut. Barker and Lieut. Cruttenden respectively, two gallant officers of the Indian navy. That by Lieut. Barker contains an account of the islands of Mushahk, Tajourah, Zeylah, Berbera, and other places along the northern coast of the great eastern horn of eastern Africa, outside the straits of Bab-el-Mandeb, and also some details of their inhabitants, with accounts of the principal places in the interior, as Hurrurh, near the Galla country, a town said to possess great advantages for penetrating into the interior.

Lieut. Cruttenden's paper relates to a more eastern and southern portion of the same country. He describes the Somali and other tribes, and the peculiarities of the port of Berbera, where the great annual mart is held, and where the natives bring down vast quantities of gum,

frankincense, &c., from the rich valleys of the interior, to exchange for the produce of Europe and of India. In the western portion of the country coffee is very abundant; to the eastward the coffee vanishes, and the hills produce so great an abundance of gums, that the author thinks the *regio thurifera* ought properly to be looked for in this direction. Upwards of 1500 tons of gums are said to be exported in one year, and great facilities for trade are said to exist.

EUROPE.

In proceeding now to narrate the progress of our science during the past year, I shall I think best consult your convenience by giving to the various subjects which I have to bring under your notice a certain geographical order, arranging them, as well as the works in which they are described, rather according to the countries to which they relate, than to those from which the expeditions have proceeded, or in which the works have been published.

HOME SURVEYS.

The progress of the surveys of our own coasts has proceeded with all the rapidity and zeal compatible with the calls which have been made on the service for the use of the vessels for other important duties. No less than six of these vessels were last year detached from their ordinary service for the purpose of conveying food to the districts on the west of Ireland suffering under the pressure of famine and distress.

The Ordnance Survey has also made considerable progress, and a survey of London, to be constructed on a very large scale, has been commenced.

Ireland.—Captain Yolland, R.E., has published an account of the measurement of the Lough Foyle base, in Ireland,—a very important feature in the Ordnance Survey of that country.

CHARTS, MAPS, AND ATLAS.

Among the charts lately published by the Hydrographical Office, I would particularly mention the two sheets of Arctic America, on which are laid down the recent discoveries of Dr. Rae. We have also received charts of several of the islands in the Greek Archipelago, and of the harbours on the coast, amongst which, one of Boodroom, the ancient Halicarnassus, is particularly deserving of attention. Several charts of the coast of England, Scotland, and Ireland have also been published during the past year. Mr. Arrowsmith has also given us a map of the discoveries of the Hudson's Bay Com-

pany's Arctic Expedition to the North of Repulse Bay, conducted by Dr. Rae, in 1846 and 1847, showing in connection the discoveries made by Parry, Ross, Back, and the Company's expedition conducted by Dease and Simpson in 1838 and 1839.

PHYSICAL GEOGRAPHY.

Berghaus' Physical Atlas.—I am happy to be able to announce the completion of the beautiful edition of '*Berghaus' Physical Atlas*,' by Mr. Alexander K. Johnston, of Edinburgh. The three last parts have just been published, and will no doubt add considerable interest to the study of physical geography, the importance of which is hardly yet fully appreciated by the public. The value of the maps contained in these last numbers has been increased by the addition of an excellent coloured Geological Map of the British Isles, by Professor Ed. Forbes; and although the colouring may be said to be somewhat bright, it conveys a vivid impression of the varied nature of the stratification intended to be represented.

To those who may be deterred by the price from availing themselves of this useful work, I am glad to announce the appearance of the first number of a similar work brought out in a cheap form, and probably containing, on a small scale, most of the information to be met with in the larger work. It is called '*A Descriptive Atlas of Astronomy and of Physical and Political Geography*,' and professes to embrace the latest information and most recent discoveries in astronomical and geographical science. The maps will be accompanied by descriptive letter-press, and will consist of three series:—1. Astronomical maps; 2. Physical Maps; and 3. Political maps. The contents of the first number are—a map of Africa; a meteorological map of the world, showing the distribution of the temperature of the air; and, thirdly, a celestial planisphere, or map of the heavens. The physical maps will be constructed by Mr. Petermann, to whom I have already alluded, and who was formerly in Professor Berghaus' geographical establishment in Potsdam.

Mrs. Somerville.—I am happy to be able to announce the publication of an interesting work in two small volumes by Mrs. Somerville on *Physical Geography*. The importance of this subject renders it the more satisfactory that it should have been taken up and treated by a writer already so well and so favourably known. The graphic style and manner in which the different branches of the subject, not in themselves new, have been arranged and discussed by Mrs. Somerville, will, I trust, make her unpretending volumes universal favourites: I

must therefore content myself with a very brief and rapid notice of their contents.

Commencing her work with a masterly sketch of the geological features of the world's history, Mrs. Somerville describes the successive formations which constitute the crust of the earth, and the different systems of animal life which have successively prevailed upon the surface,—altered, modified, and adapted as that life has been to meet the constantly varying conditions in which it was to exist. These various periods, with their respective organisms, are rapidly but clearly described, and we are brought to the termination of the tertiary period, when the earth had obtained nearly the same state and form with regard to the distribution of earth and water as prevails at present. The vast continents, mountain-ranges, and elevated table-lands of Europe and of Asia and of Africa are then described, with all their peculiarities of form and temperature ; and crossing the Atlantic, we are made to survey with a rapid glance the Andes and the mountains of Brazil, and then to pass over the deserts of Patagonia, the pampas of Buenos Ayres, the silvas of the Amazons, and the llanos of the Orinoco and Venezuela.

Nor are the peculiar characters of the frigid North less graphically described. The inhospitable regions of Greenland and the Polar Seas, and the volcanic phænomena of Iceland contrasted with its perpetual snow and never-ending glaciers, are ably brought out : and after describing the Australian continent, the Indian Archipelago, with the atolls and coral reefs of various kinds, and the thousand isles of the Pacific, the theory of alternate areas of subsidence and elevation is discussed ; and our author adds, “ There are strong reasons for believing that a continent once occupied a great portion of the tropical Pacific, some part of which subsided by slow and imperceptible degrees. As portions of it gradually sank down below the surface of the deep, the tops of mountains and table-lands would remain as islands of different magnitude and elevation, and would form archipelagos elongated in the direction of the mountain-chains.”

There is nothing improbable in this suggestion. That the form of the earth's crust has been modified and altered by the effect of volcanic phænomena, and the consequences of the periodical escape of elastic gases generated within the earth by the action of a central heat, is a principle now universally admitted. Proof is not wanting that the lofty Andes have been elevated to their enormous height by slow and gradual processes within a comparatively recent period ; and it may easily be demonstrated that where detached portions of the earth's crust have been raised by means of these subterranean forces acting

only on one extremity of a given mass, the other extremity would necessarily be proportionally depressed.

Quitting the important agent of fire, as exhibited in earthquakes and volcanoes, in modifying the earth's surface, the other agent, water, is no less forcibly discussed, as developed in the numerous river systems of the world, and in the mighty ocean itself, its tides, its currents, and its waves.

The second volume is chiefly devoted to a consideration of the animal and vegetable life distributed for the various and specific purposes to which they are adapted, over the different continents and waters of the globe. The peculiar faunas and floras of the great divisions of the earth, and of their different climates and temperatures, are spread out before us with a clear and concise generalization; and the whole subject concludes with an account of the distribution and condition of man—the last in the order of creation, as he is the first in order of intellect of all created beings on our globe. His physical and moral conditions are discussed, as well as his mental influence on others of his own race, and the empire he exercises over all around him. The progress of civilization and the moral improvement of his character hold out the hope that no retrograde movement is now possible, and “the diffusion of Christian virtue and knowledge ensures the progressive advancement of man in those high moral and intellectual qualities that constitute his true dignity.”

England.—Mr. A. K. Johnston has also published a new Commercial and Industrial Map of England, Wales, and part of Scotland, showing the lines of Railways completed and in progress, in four sheets, 1847.

He has also published a Map of Geographical Terms, to accompany which our late Secretary, Colonel Jackson, had written a glossary, which has been published within the last few days.

Mr. T. W. Saunders has published, during the last year, a geographical Catalogue of all Globes, Atlases, Maps, and Plans which he has for sale. The list at present is chiefly British; it might with advantage be extended so as to contain notices of more foreign maps.

France.—We have received during the past year a valuable collection of charts from the Dépôt de la Marine at Paris, consisting of not less than 117 charts: 12 of these, published during the past year, relate to the expedition of the *Astrolabe*, under M. Dumont d'Urville, to the South Pole and Oceania, comprising the Sandwich and Philippine Islands, the east coast of New Holland, the Caroline Islands, the islands of the Pacific, New Guinea, Tasmania, &c. We have also four charts

of various ports on the coast of Africa, several sheets of the coast of France, the Straits of Singapore, &c.; also a considerable portion of the course of the Amazon from its mouth upwards, published in 1846.

Geographical Positions.—From the table of geographical positions by M. Daussey, extracted from the 'Connaissance des Temps de 1848,' we learn that many additions and corrections have been made this year in the positions of several important places. In France the general triangulation of 1844 has led to many corrections. The longitude of Dublin has been considerably modified, in accordance with the latest Admiralty Charts. In Germany, New Holland, and the Antilles, some modifications have also been made, from better and more recent information.

Laguillermie.—I cannot avoid calling the attention of the Society to some curious and ingenious maps constructed by M. Laguillermie of Paris. These maps are so shaded as to bring out the convexity of the spheroid in all parts—that portion to which each map specially refers being placed in the centre, and consequently least shaded and least distorted; the other portions, being naturally foreshortened, are more distorted, and can only be studied in the different sheets of the Atlas. In short, these spherical maps of M. Laguillermie are intended to give an idea of the appearance of the earth as seen from different points without it. M. Laguillermie has presented a series of these maps to the Society.

Jomard.—M. Jomard has prepared for publication a work under the title of 'Monuments of Geography,' intended to form a collection of maps of the middle ages. The first portion of the work consists of an introduction, with plates of celestial globes, and others relating to cosmography, an Arabic astrolabe, &c. The more geographical portion consists at present of 30 plates, amongst the oldest of which are—the map of the Scheryf El-Edrisi; an itinerary of a pilgrimage from London to Jerusalem, taken from a MS. copy of the Chronicles of Matthew Paris, of the thirteenth century; the famous Venetian map of the brothers Pizzigani, with the date 1367, preserved in the library of Parma. It is said that the whole work will contain at least 100 documents of this description.

M. Walchenaër, perpetual secretary of the Académie des Inscriptions, has recently published two maps of France, one of which is specially intended to point out the numerous features of physical geography, the other to illustrate the comparative geography of ancient Gaul.

Italy.—Your attention was called by my predecessor last year to the changes taking place in the height of the edge of the crater of

Vesuvius, as compared with a fixed point (the Punta del Palo), which for upwards of half a century had been the culminating point of the outer circumference. It appears from a letter addressed to M. Arago by M. Amante, that the burning cone, which on the 27th of February, 1846, was 9·5 metres *below* the Punta (the height of the Punta being 1203 metres), had been gradually rising, and on the 5th of July, 1846, was 1219·5 metres, consequently 16 metres *above* it; but on the 16th of August, 1847, the cone had reached the height of 1240 metres, viz. 37 metres above the Punta.

Sardinia.—Several additional Numbers (56 to 70 inclusive) of the 'Dizionario Geografico-Statistico Commerciale degli Stati di S. M. il Re di Sardinia' have been published since our last anniversary.

Belgium.—M. Vandermaelen has published 6 more sheets of the map of Belgium, on a scale of $\frac{1}{100,000}$. He has also commenced the publication of a large topographical map of Belgium, in 250 sheets, and on a scale of $\frac{1}{250,000}$. The execution of these maps seems in every way equal to their importance.

Kosmos.—The translation of the second volume of the 'Kosmos' of Baron A. von Humboldt has appeared since our last meeting. It must become a universal favourite. In many respects it occupies a different field from that of its predecessor. While the first volume was chiefly directed to a comprehensive sketch of the phenomena of the outward physical world, this second volume is rather directed to the consideration of the influence of outward nature on the mind of man, and of the effect thereby produced in modifying the feelings and advancing the civilization of the human race. The work is divided into two parts:—First, the incitements to the study of nature; and, second, the history of the physical contemplation of the universe. There is a strength and a simplicity, and at the same time a truth pervading all the observations in this work, which cannot fail to charm. Who does not feel, and at the same time cherish, the force of such a remark as the following, in alluding to the impression made on the mind by groups of exotic plants in hothouses or in the open air?—"I have already appealed on this subject to my own youthful experience, when the sight of a colossal dragon-tree and of a fan palm, in an old tower of the Botanic Garden at Berlin, implanted in my breast the first germ of an irrepressible longing for distant travel." What do we not owe to that old dragon-tree and fan palm!

But I have only room to quote a concluding paragraph:—"I approach the termination of a comprehensive and hazardous undertaking. More than two thousand years have been passed in review, from the earliest state of intellectual cultivation among the nations who dwell

round the basin of the Mediterranean and in the fertile river districts of Western Asia, to a period the views and feelings of which pass by almost imperceptible shades into those of our own age. I have sought to present the history of the gradually developed knowledge and recognition of the universe as a whole, in seven distinctly marked sections, or, as it were, in a series of as many distinct pictures. Whether any measure of success has attended this attempt to maintain in their due subordination the mass of accumulated materials, to seize the character of the leading epochs, and to mark the paths in which ideas and civilization have been conducted onwards, cannot be determined by him who, with a just mistrust of his remaining powers, knows only that the type of so great an undertaking has floated in clear though general outlines before his mental eye." Alex. von Humboldt may safely appeal to the verdict of the universal world.

Austria.—Professor W. Haidinger has published, in 1847, a notice intended to accompany his geognostic map of the Austrian monarchy in nine sheets, explaining the sources from which his information was derived.

Germany.—Professor von Oeynhausen has published at Berlin, during the last year, a large geognostical and orographical map of the neighbourhood of the Laacher See in the Lower Eifel, in eight sheets. This map extends from Brohl to Lahnstein from N. to S., and from Mayen to Ems from E. to W.; it is on the large scale of $\frac{1}{100,000}$, or about $2\frac{1}{2}$ inches to the mile. It is extracted from the cadastral map of the Rhine provinces, and is accompanied by an explanatory memoir by the same author.

Amongst the many maps which have lately appeared in Germany, I may mention a geological map of Hesse-Darmstadt, published by Becher, in which the different formations are represented by printed colours; Spruner's historisch-geographisch Hand-Atlas, published at Gotha, consisting of 73 coloured maps; Sieder's map of Germany, the Netherlands, Belgium, and Switzerland, with a classification of mountain chains, in 25 sheets; a map of the course of the Oxus, by Zimmerman; and an atlas by Sydow.

Norway.—Captain Roosen of the Engineers, in Norway, has presented to the Academy of Sciences a geographical map of Norway, with a MS. memoir on the physical geography of that country.

Sweden.—*Maps of the Crown-Prince.*—I cannot omit to notice the maps of part of Sweden executed by the Crown-Prince, and exhibited by Count Rosen to the meeting of the British Association at Oxford. One of these maps represents the physical features of the country in a scale of colours, a dark-green tint being used to represent all parts of

the country less elevated than 100 feet above the sea ; another represents, also by a scale of colours, the extent of the wooded districts and their relative ages ; on a third map are marked all the mining districts, the mines themselves being marked by dots of colours ; the route by which the ore is conveyed to the blast furnaces, and the ports, being indicated by lines of the same colour.

A map by Colonel Löwen was also exhibited at the same time, showing the amount of population in different districts varying from 500 to 15,000 per square mile. This was also done by the use of different colours.

RUSSIA.—*Petschora.*—Count Keyserling, one of the companions of Sir R. Murchison in his Russian travels, has lately published a work entitled 'Scientific Observations on a Journey into the Petschora Country.' By this work much additional information is gained respecting the great north-eastern angle of Russia in Europe, which is watered by the river Petschora. Count Keyserling's attention being chiefly directed towards the geology of the district, the geographical and astronomical duties were intrusted to M. von Krusenstern, of the imperial navy. My remarks must be confined to the latter portion of the work. In this respect the principal results obtained have been the fixing the latitudes and longitudes of from 45 to 50 places by means of chronometers and circummeridional altitudes of the sun, and laying down the course of the rivers by constant observations of their daily track recorded in a regular nautical log-book. M. von Krusenstern has thus been able to give a full account of the geography and hydrography of the Petschora country.

The boundaries of the Petschora country are stated to be, on the E. the Ural ; on the W. the Timan mountains, a slightly elevated range of hills forming the watershed between the confluent of the Petschora and those of the Mesen, the Wymm, and the Wytshchegda ; on the N. the Polar Sea ; and on the S. the Upper Wytshchegda and the Upper Petschora, with their confluent. The space contained within these limits is calculated to be about 6500 geographical square miles.

M. von Krusenstern fully describes the different people and races by whom this vast district is inhabited, together with their trade and commerce. Fishing is their principal occupation, the produce of which they exchange with the traders for corn from the more southern regions of the Volga. This, however, on account of the difficulties of transport, fetches a high price in these arctic regions. The communications are chiefly kept up by rivers, with short *portages* from one to the other. Many parts of the country are studded with small lakes, showing a striking uniformity of character with some of our own possessions in

the northern regions of the American continent. The great wealth of the country consists in its vast forests, chiefly of larch. These are of increasing value for ship-building, as timber for such purposes is beginning to be scarce in the government of Archangel. The different river systems of the district, together with all their confluent, are then systematically described. We are still led by Count Keyserling to expect appendices on the structure of the country, together with notices on its physical condition, natural history, and statistics.

Northern Ural.—It was announced in the Address from this chair last year, that the Russian Geographical Society was about to dispatch an expedition of discovery to examine the northern portion of the Ural mountain chain. Considering the investigation of the vast and hitherto unknown districts of its own country as the chief object of its exertions, its attention was at once directed to the north-eastern portion of European Russia, rather than to the more distant regions of Siberia, viz., to the northern Ural district, a country in a scientific point of view less known than almost any other. Having come to this determination, it was most liberally assisted by the imperial treasury. The boundaries of the district to be surveyed are, on the N. the Arctic Ocean, on the E. a line drawn from Bogoslowsk to Beresow, and from thence along the Ob as far as its embouchure; and on the W. a line beginning on the Korotaicha, then following the Ussa and the Petschora, and afterwards running along the Kolwa and Wyschera towards Bogoslowsk. Some idea of the nature of the expedition may be formed by stating, that its most southern point is in the latitude of Tscherdyn, about 62° N. The exploring party left Tscherdyn on the 30th of May in two divisions. The only accounts which have reached this country are from Colonel Hoffmann, the chief of the expedition, dated the 15th of July O.S., from the sources of the Petschora.

The chief results then reported were that M. Kowalski had fixed by astronomical observations 24 points; the topographer, M. Jurjew, had traced the course of the Wyschera from Tscherdyn to its sources, and the direction of the mountain-chain from thence to the sources of the Petschora. M. Branth had made a large collection of objects of natural history. With regard to the physical geography of the country Colonel Hoffmann says—"The long-extended mountains with conical summits are separated by valleys of no great breadth, and scarcely reach the height of 3000 feet; their flanks are well wooded, but the ridges are bare and covered with loose broken stones." It was proposed that the expedition should occupy two years: we shall await its results with interest and anxiety.

Erman.—The name of Adolph Erman has been so often mentioned

in this Society in terms of admiration and of praise, that I cannot omit alluding with satisfaction to the fact that Mr. Cooley has published a translation of his work 'Reise um die Erde,' under the title of 'Travels in Siberia including excursions northwards down the Obi to the polar circle, and southwards to the Chinese frontier.' You will remember that in 1843 the Council awarded a gold medal to Professor Erman for his extensive geographical labours. On that occasion Sir R. Murchison entered fully into the merits of his works; I will, therefore, now only observe, that the scientific position of Adolph Erman, and the interest attaching to the physical and geographical characters of the country through which he travelled, and of which we are still so ignorant, impart a value to Mr. Cooley's undertaking, only inferior to that which attaches to the 'Kosmos' of Humboldt. While the one has described in vivid terms of reality the charms and wonders of the tropical and equinoctial regions of America, we are here no less forcibly arrested by the wild yet picturesque description of the roaming Samoyede, and the wealth and comforts of the Yakuts in a climate which at first sight seems hardly compatible with human existence: but I must refer you to the volumes themselves to appreciate their merits.

Mr. Cooley informs us that he has ventured to abridge the original in the earlier portion of the work, viz., the journey across Europe from Berlin to Tobolsk. He has thus been enabled to give, in two volumes and without curtailment, the more novel and interesting part of the author's narrative in Siberia.

Hoffmann.—Professor Hoffmann has recently published an account of his journeys in former years to the gold-washings in eastern Siberia. The work will be found to contain much interesting information for the geographer and the geologist. He was sent by the Government to investigate the geognostic character of the gold-works of Siberia. The results, already published in Russia, but without the geographical details of his journey, were particularly alluded to by Sir R. Murchison in his Address from this chair in 1844, and therefore require less notice at my hands on the present occasion. The chief locality of this Siberian el Dorado is in the vicinity of Irkutsk, westward of the Lake of Baikal, and on the northern flanks of the Sagan mountains, the eastern prolongation of the Altai. The land in Siberia belongs to the crown, but permission is granted to private individuals, under certain conditions, to search for gold. The result is very uncertain. Professor Hoffmann gives a striking sketch of the difficulties to be overcome by the Siberian gold-searchers. "The whole country in which the gold-washings are situated is one universal *taiga*, or district covered with primeval forests, only slightly peopled by nomadic hunting tribes, to

whose tents there are no roads, and which is only rarely visited in the winter by the foot of a Russian fur-hunter. The moisture of the atmosphere has almost everywhere converted the soil into a morass, extending from the marshy valleys to the summits of the mountains, and in which both man and beast sink deep in crossing it. Spots of grass and pasture are very rare amidst the mossy covering. The gold-searchers, separated from villages many hundred wersts, must carry all their provisions with them, which can only consist of dry and salt food. What with sleeping on wet moss, constant rain, digging in the morass, they never have their clothes dry; add to this the constant fatigue in sinking the pits, which are scarcely ten feet deep before they are filled with water; this must be pumped out, while the labourers, standing deep in the mud, carry down the shaft to the underlying rock, the only means of ascertaining that they have not neglected any gold-sand stratum." Many pits are sunk in vain, and a district is often abandoned in despair in the immediate neighbourhood of the precious object of search. Moreover, the adventurers are often overtaken by the winter's snow before they have time to extricate themselves from this wooded labyrinth.

Tradescant.—From Russia we have also lately received an interesting work from the pen of Dr. J. Hamel, member of the Imperial Academy of Sciences at St. Petersburg, entitled 'Tradescant the Elder, in Russia, 1618,' in which the author gives a full account of the origin of the commerce between England and Russia, with an analysis of the earliest travels in the North, and of the voyages of discovery round the North Cape to Archangel, by which that commerce was first established. The name of Tradescant is well known as the founder of the first museum of natural history in this country, which became the nucleus of the Ashmolean Museum. The most interesting portion of the volume is the account given by Dr. Hamel of his discovery, during his stay in this country, of a MS. in the Ashmolean Museum, marked No. 824—XVI., and entitled 'A Voiag of Ambassad (to Russia), undertaken by the Rt. Honorable Sir Dudlie Diggs in the year 1618, &c.' Dr. Hamel proves satisfactorily, from internal and collateral evidence, that this MS. is the work of John Tradescant himself, of whom no writings were hitherto supposed to exist, and who thus appears to have accompanied Sir D. Diggs as naturalist to the expedition. I trust that some of our antiquarian or publishing societies will undertake the publication of this rare work, one of the earliest accounts we have of a voyage embracing scientific objects.

ASIA.

I shall now proceed to state the progress of our science in the more tropical regions of Asia.

Bosphorus.—M. Hommaire de Hell, who quitted Paris last year with the intention of examining the country to the east of the Caspian Sea, and near the lake Aral, has sent home an interesting statement respecting the levels of the Bosphorus, published in the *Comptes Rendus*. From a series of observations made with great accuracy, he concludes that there is no appreciable difference of level between the Black Sea and the Sea of Marmora; consequently that there is no real current flowing out of the Black Sea through the Bosphorus. He supposes all the apparent currents to be entirely owing to the action of the winds; and, as the north winds are the most prevalent, the apparent and the most constant current flows towards the south. This, however, he supposes to be compensated for by the strong currents flowing to the north during the southerly winds. M. Hommaire de Hell subsequently proceeded from Trebizond to Diarbekir, through Kurdistan, and thence to Tabriz (here called Tauris) by Betlis and Lake Van. Many sites have been fixed by observations of altitude and compass bearings. I may here mention that M. Hommaire de Hell's former work, entitled '*Travels in the Steppes of the Caspian Sea, the Crimea, the Caucasus,*' &c., has been translated into English, and published in the '*Foreign Library*' of Chapman and Hall.

Asia Minor.—The discoveries of our associate, Sir Charles Fellows, in Lycia, and adjacent parts of Asia Minor, must be in the recollection of my hearers. We are informed that the results of his several expeditions into that country are about to be recorded in a permanent manner by the publication of a work by Mr. George Scharf, illustrating the Xanthian marbles, and the scenery of Xanthus itself. The engravings will be accompanied by descriptive letter-press by Sir C. Fellows.

M. Tchihatcheff, the distinguished Russian geographer and geologist, continues his explorations in Asia Minor. In a letter to M. Elie de Beaumont, recently published, he has given an account of the discovery of extensive beds of emery in the western portions of Asia Minor, particularly between the ruins of Stratonicea in Caria, and Smyrna.

Col. Lapie has completed a Map, in six sheets, comprising the countries situated between the *Ægean* Sea and the Indus, viz. Asia Minor, Armenia, Syria, the banks of the Euphrates, Persia, and Bokhara.

Syria.—Amongst the works which have been published since our last anniversary, giving additional information respecting the ancient and modern geography of the East, I must not omit to notice the volumes of Dr. Wilson, entitled ‘Lands of the Bible.’ It is true that most of the localities he visited have been already described, yet something new is always to be gleaned in such countries as these, by every successive traveller who employs his time and his eyes as industriously as Dr. Wilson, and who enjoys, as he did, the advantages of understanding the language of the people, and of entering into the spirit of the manners of the East. But I can only cursorily allude to a few of the new points he has established. In crossing the Peninsula of Mount Sinai we have an account of the discovery of ancient Egyptian mines not far from the celebrated Valley of Mukatteb, and much interesting detail respecting the Wadi Arabah and its neighbourhood, the localities of Petra, and the inhabitants of the surrounding districts. Dr. Wilson does not sanction the theory of the Wadi Arabah having been the channel by which the waters of the Jordan escaped previous to the destruction of the cities of the plain; he considers that the elevation of the Wadi Arabah to its present height, simultaneously with the depression of the valley of the Jordan and the bed of the Dead Sea, argues a greater convulsion of nature than we have any authority for assuming. In Palestine itself there is much of novelty and interest in Dr. Wilson’s narrative; I may mention his visit to the Dead Sea, and his notice of an island on its waters, not mentioned by many travellers, and which he cautiously suggests may have been a mass of floating bitumen. He subsequently visited the sources of the Jordan at Dan Baniyas and Hasbeiya, respecting which we have some interesting details. We have also a full account of the curious Assyrian sculptures and cuneiform inscriptions on the rocks near the mouth of the Nahr el Kelb, or ancient Lycus. The work is illustrated by numerous maps and plans. The map of the Holy Land is founded on the excellent one of Kiepert, executed under the direction of Carl Ritter, and embraces, as Dr. Wilson observes, all the improvements, modifications, and additions which the observations and inquiries of himself and companions had suggested.

Arabia.—I have also to announce the publication during the past year of two more volumes of Carl Ritter’s ‘Universal Geography,’ forming the eighth volume of Asia, and the sixth of Western Asia.

These volumes are entitled ‘The Comparative Geography of Arabia,’ and fully deserve the same praise and commendation already bestowed on their predecessors, for patient investigation and the collection of an immense mass of information. The history of the Pen-

insula of Arabia, from the earliest times down to the conquests of Mahomed, occupies the first chapter, this is followed by its subsequent history down to the present time, and by a full account of its geographical condition in the middle ages. The geographical description itself is divided into—1st, an account of the coast of Arabia bordering on the Persian Gulf; 2nd, the interior of Oman; 3rd, the oceanic southern coast of Hadramout and Aden; 4th, the western coast of the peninsula of Arabia along the Red Sea—this is the most elaborately worked out portion of the work, treating fully of Yemen, Hedjas, Mecca and Medina, &c.; and 5th, the interior of the peninsula and the country of the Wahabites. The work concludes with an Appendix giving an account of the geographical distribution of some characteristic products of Arabia. These are the distribution of the coffee-tree in the old world, both in its wild and cultivated state, as well as its introduction to the civilization of the Eastern and Western worlds. The camel and the date-palm, in their original state, and subsequent application to the service of man, are also fully discussed.

Peninsula of Sinai.—An interesting notice has been published in the 'Bulletin de la Société de Géographie,' detailing the travels of Professor Lepsius in the Peninsula of Sinai; it is accompanied by a map, pointing out the true position of Mount Sinai and Horeb, according to the views of Professor Lepsius. It is impossible to read this memoir without being struck by the learning and erudition which the Professor has brought to bear upon the subject, and the talent with which he maintains the views he has adopted.

Arabia.—A new Map of Arabia is announced in the 'Bulletin de la Société de Géographie,' corrected down to the last year from the most recent surveys and explorations. M. Jomard assures us that the greatest care has been bestowed on its construction.

Assyria.—Important discoveries have been lately made on the banks of the Euphrates and the Tigris, and particularly amidst the ruins of ancient Nineveh, in connexion with which the names of M. Botta and Mr. A. Layard have been brought so frequently before the public. Mr. Layard has rendered a great service to archaeology by the many monuments of antiquity he has rescued from destruction. Besides those already arrived in this country, two or three hundred cases are now waiting the means of transport at Bombay or in the Persian Gulf. Mr. Layard is about to publish an account of his researches and his discoveries in ancient Assyria. During the nine years this gentleman has been travelling in the East, much of which time he spent amongst the Druses, he must have been enabled to collect a considerable amount of valuable geographical information.

Indian Surveys.—During the last year, an account of the measurement of two sections of the meridional arc of India, extending from lat. $18^{\circ} 3' 15''$ to $29^{\circ} 30' 48''$, by Lieut.-Col. Everest, late Surveyor-General of India, has been published by order of the Court of Directors of the East India Company. It is intended to publish the first sections of the arc, which were measured by Lieut.-Colonel Lambton, uniform with the above. Lieut.-Col. Waugh, the Surveyor-General of India, is preparing to extend a series of triangles over the Punjab; he will start from one of the sides of the meridional arc. The triangulation of Bengal is proceeding satisfactorily; several parties are engaged on different meridians between that of Karora and Calcutta. A base of verification has been measured ere this in the neighbourhood of Darjeeling. A trigonometrical series is being carried on from Calcutta along the sea-coast to Ganjam. Several parties are also engaged on revenue and topographical surveys of the Bengal provinces. The triangulation of the Bombay presidency has been completed as far as the 20th degree of north latitude. Sheets 67 and 68 of the Indian Atlas have been published, and also new editions of sheets 47, 48, 49, 65, and 66.

Marine Surveys.—A Chart of the N.E. coast of Africa, from Cape Gardafui westward towards the Red Sea, by Captain Carless, I.N., is in the hands of the engraver, and will be published shortly. The survey of the Coromandel coast is progressing satisfactorily under Lieut. Fell, I.N.; as is also that of the coasts of Malabar and the Konkun, under Lieut. Moutrion, I.N. When these surveys are completed, nearly the whole coast, extending from Cape Gardafui round the Red Sea, the Persian Gulf, Hindostan, Arracan, and Tennasserim, will have been laid down by the officers of the Indian navy.

India.—We learn from public papers that an Archæological Society has been established at Delhi, and that, extending their researches beyond the limits of their own district, by the aid of the late Governor-General, they were about to explore the newly-discovered ruins of Ranode, in Scindiah's territory.

The publication of Baron Hugel's Map of the Punjab and Cashmere has been at last effected. I cannot avoid expressing a regret that this valuable work should have been so long delayed.

A Map of Bombay and the adjacent district has been published on a large scale, by the Great Indian Peninsula Railway Company, exhibiting the lines surveyed in detail and explored by that Company. Should the Companies established for the purpose of introducing railways into India succeed in their important schemes, we may look forward to much information in the cause of physical geography, from

the detailed surveys of the country which they must institute, and the close examination they must make of the various features which constitute the character of the Western Ghauts and the elevated plateaux from which the great rivers of Hindostan, such as the Godavery, the Kistna, the Tapti, and the Nerbuddah, take their rise.

And here I cannot omit to notice the interesting volume of Dr. Hoffmeister detailing his travels in Ceylon and continental India, including Nepal and other parts of the Himalayas to the borders of Thibet, with appendices, addressed to Baron Humboldt, on the geographical distribution of coniferæ on the Himalayan Mountains, on the vegetation and on the birds of the Himalayan Mountains. Dr. Hoffmeister travelled with Prince Waldemar of Prussia, and we are reminded by Carl Ritter, in a brief introduction, that the talented author was unable to complete the work himself, having fallen at his Prince's side on the battle-field of Ferozepore.

Assam.—We have obtained some additional information respecting the productions and geographical features of Assam by the publication of the work of an officer in the Bengal Native Infantry, during the last year. The natural capabilities of the country, both for growing tea and cotton, and collecting gold from the washings in the rivers, seem hitherto to have been completely marred by the insuperable indolence and viciousness of the inhabitants.

Chinese Tartary.—From India we have received accounts that an exploring expedition has been undertaken by the Indian Government, from which we may expect much valuable information respecting the countries north of the Himalayas, and extending to the frontiers of Chinese Tartary. The expedition, consisting of Captain Cunningham of the Engineers, Lieutenant Strachey, and Dr. Thompson, started from Simla about the 10th of August last. They were to proceed along the upper valley of the Sutlej, traversing the Himalaya range by the Nitec Ghaut. After tracing the junction of the eastern and northern branches of the Sutlej, they were to proceed northwards towards Yarkand, wintering at Khoten. The following season they were to proceed eastwards in different detachments, meeting again at Lassa—Lieutenant Strachey tracing the upper course of the Indus to Garoo, proceeding thence to the Lake of Mansarowara, which he already visited in 1846, and then exploring the course of the Sanpoo, to ascertain whether it falls into the Bramahputra or the Irawadi. At the same time Captain Cunningham will keep a more northerly course from Khoten to Lassa, and will endeavour to penetrate into the territories of the Celestial Empire. The expedition is well provided with

instruments of all kinds necessary for astronomical observations, and for the extension of geographical knowledge.

It is impossible not to hope for great and valuable results from such an undertaking; and it is matter of congratulation for the science of geography that the Indian Government have thus resolved to avail themselves of the services of some of their servants most distinguished for their scientific attainments, not only to develop the resources of their own territories, but to explore those of their more immediate neighbours.

China.—From the last annual report on the progress of geography by M. Vivien de St. Martin, we learn that the two intrepid missionaries, MM. Huc and Gabet, who had penetrated to the furthest extremities of Thibet, and had even reached Lassa, had been compelled to return to Canton over land. We are led to expect a full account of this remarkable journey, and look forward with much interest to the details it will contain of the almost unknown country through which they passed.

Mr. Thomas Taylor Meadows, interpreter to Her Majesty's Consulate at Canton, has published a work called 'Desultory Notes on the Government and People of China, and on the Chinese Language.'

Captain Forbes has also published a work entitled 'Five Years in China, from 1842 to 1847; with an Account of the Occupation of the Islands of Labuan and Borneo by Her Majesty's Forces.' In both these works will be found much information respecting the manners of the Chinese, their habits, and their customs.

And here I would wish to call your attention to a curious geographical document presented to the Society by Mr. E. O. Smith, viz. a native geographical map of China, brought from Nankin by Mr. William Houghton, R.N. Although in its general form strangely distorted according to our views of geographical proportions, it may yet be useful in pointing out the relative positions of places. At all events it is interesting as showing the state of geographical knowledge among the Chinese.

Java.—A very beautifully executed map of Java has been lately published by V. der Velde in two sheets. The information on which it is constructed has been obtained from official documents, and it is accompanied by an explanatory memoir.

Borneo.—The interest connected with the island of Borneo, since the philanthropic enterprise of Sir James Brooke was brought under the notice of the public by the volumes of Captain Keppell, describing the operations of Her Majesty's ship *Dido* while employed, in co-operation with the Rajah of Sarawak, in suppressing the piracy of the

Malays, has been so great that no less than three works on Borneo have been published during the last year.

The first contributor to our knowledge of Borneo, and the proceedings of Sir J. Brooke, appears in Mr. Low, for some time secretary to the Rajah of Sarāwak. His volumes contain very valuable information respecting the natural history and mineral productions of Borneo, particularly in the neighbourhood of Sarāwak; and as his pursuit carried him far into the interior, we find much geographical information in his interesting pages. In an ethnological point of view, also, his work deserves honourable mention, as containing many details respecting the character of the Malay and Dyak tribes.

Mr. Frank Marryat, formerly midshipman on board the Samarang, has published a work containing many drawings of the peculiar scenery of Borneo and the Indian Archipelago, as well as of the costumes and arms of the inhabitants.

And, thirdly, we are indebted to Captain Rodney Mundy, R.N., for editing the interesting Journals of Mr. Brooke, full of new matter, both geographical and ethnological, and valuable not only for the details they contain of his progress in Borneo and Celebes, and the manner in which he gradually established his influence in that country of his adoption, but also for the insight they give of the high motives by which he was actuated. Every page is suggestive of reflections, and breathes an affectionate sympathy for the Dyaks of the East, no less than for the social happiness of his native land. Captain Mundy has added to the value of these volumes by appending a Journal of his own proceedings, with some details of the geography, geology, and natural history and productions of Borneo.

Indian Archipelago.—During the past year we have been gratified with the publication of Sir E. Belcher's Narrative of the Voyage of Her Majesty's ship Samarang during the years 1843, 1844, 1845, and 1846, when employed in surveying the islands of the Eastern Archipelago. After visiting Borneo his attention was first directed to the islands lying off the coasts of China, which were examined in the following order:—The Bashees, Meia-co-shimahs, Luzon, Mindoro, Mindanao, Sooloo, Borneo, Celebes, and Ternate. After again touching at Borneo, the Samarang revisited Sooloo, Manilla, and Hong-Kong, with the Bashees, Meia-co-shimahs, Loo-Choo, Quelpart, Korea, and Japan; then returning by Loo-Choo and Hong-Kong, and by Manilla and the Mindoro Seas to Mindanao, and to our old possession of Balambangan, they carried out the complete survey from that island to Labuan, revisiting Sarāwak and Singapore. The volumes are full of geographical and ethnological details, and their value is increased

by the publication of Mr. Adam's notes on the natural history of the countries visited by the Samarang. I must also mention Mr. Jukes' work, giving an account of the proceedings of the Fly, chiefly employed in surveying the coast of New South Wales, under Captain Blackwood, R.N., whom you have this day elected a Member of the Council.

AFRICA.

Egypt.—Directing our attention to the lands of Africa, I have to announce that Mr. Joseph Bonomi has published a small map of ancient Egypt under Antoninus Pius, A.D. 140. This map is confined entirely to the representation of the ancient geography of the country, and will be found a useful aid to the classical student and to the comparative geographer.

M. Jomard has presented to the French Academy a map of Arabia and the surrounding countries, prepared by himself, to illustrate the history of Egypt under Mehemet Ali.

M. Saint Preuve has, in a memoir addressed to the French Academy of Sciences, called in question the accuracy of the levelling of the Isthmus of Suez by the engineers of the Egyptian expedition. The comparative levels of the ocean and of the Mediterranean have also been noticed by him; and considering the physical importance of the correctness of such a statement, M. Saint Preuve has recommended that the work should be repeated. M. Rochet (d'Hericourt) is about to undertake this task, and new instruments have been made for him by M. Brunn.

Abessinia.—*White Nile.*—Amongst the important information which we have received during the past year, few subjects have attracted more attention than the announcement, in the 'Athenæum' of Oct. 9, by M. Antoine d'Abbadie, that he and his brother had at length, after nine years of dangers, vexations, and difficulties, succeeded in ascertaining the source of the main stream of the Egyptian Nile—the White Nile, or western branch—which was supposed, according to a paper by Dr. Beke, lately published in our Journal, to exist two or three degrees to the S. of the equator. This announcement was the more gratifying in consequence of the absence of all communication from these enterprising travellers during the last three years. M. d'Abbadie states his conviction, founded on his own observations and on the testimony of many witnesses, as to the course of the river S. of the furthest point he reached, that the Gibé of Inarya, in lat. 34° 38' E. and long. 7° 49' N., is the real source of the White Nile. This account closely corresponds with that given by Dr. Russegger in his Travels in Abessinia, &c., vol. ii. p. 87. It would

thus appear that the Gîbé falls into the Godjeb, and that thence together flowing round the mountains of Kaffa and Gamaro, and turning to the westward, they fall into the Shoaberri of M. Arnaud. It is true that the whole course of these rivers has not yet been traced, and much also depends on the correctness of the statement made by some geographers, that the Godjeb forces its way through the mountains to the S.E., and falls into the Indian Ocean. This, if true, would at once disprove M. d'Abbadie's statement, but it hardly seems probable. It is, however, now the great point to make out, in the absence of the possibility of tracing the Gîbé and the Godjeb to their final destination, either in the Indian Ocean or the White Nile. It would appear from M. Arnaud's statement, that the valley of the White Nile, after ascending nearly due S. as far as the third or fourth parallel of latitude, turns away towards the E., and then gradually bears away N.E., N., and N.W., until it finally reaches the sources about the seventh parallel of latitude. Several streams, bearing apparently the same name of Gîbé or Gibbe, rise in this mountain district, the parent source of the Dedhesa, the Baro, and the Godjeb. We await with great anxiety further information on this interesting point.

M. Rochet (d'Hericourt), already well known for two journeys in the southern parts of Abessinia, is again preparing to penetrate into the country, and to traverse it from N. to S. After reaching Godjam, and crossing the Blue Nile, it was his intention to penetrate into Inarya and Kaffa. The French Academy have furnished M. Rochet with detailed instructions on several points of scientific interest, to which it was desirable he should direct his attention, and which I cannot avoid recommending to the notice of all future travellers. Those which are published in the *Comptes Rendus*, vol. xxv. p. 183, relate chiefly to magnetism and meteorology. They will, I am sure, be read with interest by those who are aware of the importance of such observations, and particularly of their bearings on the progress of geographical science.

Dahomey.—Another African traveller, Mr. Duncan, one of the survivors of the Niger expedition of 1841, has added to our knowledge of the interior of Western Africa by publishing a *Narrative of his Journey from Abomey to Adafoodia*, in 2 vols. 8vo., one of the most interesting portions of which is the account, from an eye-witness, of the death of the unfortunate Mungo Park.

There is one important conclusion which may be safely drawn from the remarks of Mr. Duncan, and which it is not altogether irrelevant to mention on the present occasion, viz. that there exists amongst the natives of this portion of Africa a strong desire to see introduced

amongst them the advantages of a more extended commerce. With commerce will necessarily be united a more enlightened civilization, and this must lead at once not only to a more perfect and more intimate knowledge of the geography of this hitherto *terra incognita*, but will also tend to strike a more deadly blow at the African slave-trade than has yet been or ever can be effected by the most powerful fleet we might maintain in those fatal seas.

Sahara.—From Mr. James Richardson we have had two volumes lately published, giving an account of his travels in the Great Desert of Sahara in 1845–46, with a description of the oases and cities of Ghadames, Ghraat, and Mourzuk. These volumes are useful contributions to our knowledge of the interior of the imperfectly known regions of Northern Africa; and they describe some hundreds of miles of desert routes over which no Europeans had previously passed, as well as several of the cities of the Desert, of which we had not before received accounts from European visitors. From certain observations in the introduction we are led to expect the speedy publication of a large map of the routes of this part of Africa, as well as some reports on the commerce and geography of the Great Desert. From Mr. Richardson's knowledge of the languages of this part of Africa, of which he has published some vocabularies, we may look forward to much useful information on these subjects.

M. Raffenel, whose adventurous journey into the interior of Africa has been already mentioned from this chair, is still engaged in his arduous enterprise. According to the last accounts received at Paris from him, after resting some time at Bakel, a French Senegambian establishment in the country of the Sarracolets, this enterprising traveller had crossed and explored the Mountains of the Moon (so called). He proposed to penetrate into the inner desert, and would then direct his course towards Western Nigritia.

Mozambique.—Lieutenant Bernard has published an account of a three years' cruise in the Mozambique Channel for the suppression of the slave-trade. The narrative is chiefly devoted to the details of the principal object of the voyage, but it also contains some account of the towns on the coast, with the habits and manners of the natives, as well as a description of the interior of the country in the neighbourhood of Quillimane, the river of which is said to be navigable during the floods for 260 leagues.

South Africa.—M. Adolphe Delegorgue, of Douai, has published during the past year an account of his travels in South Africa, during which he penetrated from Fort Natal as far as the tropic of Capricorn,

visiting the Amazoulia and Mohatisses Caffres, respecting whom, and the geographical features and natural productions of the country, he has brought back much valuable information.

Mr. Arrowsmith has published, during the past year, a map of the Eastern frontier of the Cape of Good Hope; and Mr. Charles Bunbury has given to the public an account of his residence at the Cape of Good Hope, in which the botany of the colony and the geographical distribution of its plants are fully and ably discussed.

AUSTRALIA.

I now come to that portion of the globe which embraces our Australian colonies, and here I find that Mr. A. K. Johnston has published a map of Australia Felix, or the district of Port Philip, compiled from the latest authorities up to 1847, extending from Adelaide to the Hunter river, on a scale of 177,177.

Mr. Burnett, the deputy-surveyor of New South Wales, is reported to have traced the river Boyne to lat. $24^{\circ} 53' 50''$, where it was strongly influenced by the tide, and to have ascertained that its outlet was in Harvey's Bay.

Maps.—I am glad to report that we may expect the publication of another sheet of Arrowsmith's map of Western Australia in a short time; as well as a new map of Eastern Australia, in six sheets, by the same distinguished geographer, who has also made considerable progress in a large map of New Zealand, in which many corrections are made in the positions of important places.

The extraordinary mineral treasures of the colony of South Australia will give a great impetus to its prosperity, and as a necessary consequence will lead to a great increase in our geographical knowledge of the adjacent territories. We are not therefore indifferent to the accounts which have been recently sent home of the newly discovered mines of copper and of lead in that part of the world. In the Burra-Burra copper-mines some of the ores are said to be almost pure copper. Lead has also been discovered in the mountain limestone between Macquarie Harbour and the territory of the Van Diemen's Land Company.

The past year has witnessed the publication of Sir T. Mitchell's journal of his expedition into the interior of tropical Australia in search of a route from Sydney to the Gulf of Carpentaria. This expedition was mentioned in the President's address from this chair last year, and the principal results have already been alluded to in papers and extracts read before the Society; although the expedition failed in its main object, we have here much information respecting the interior

of the colony. It completes, moreover, as the author informs us, a series of internal surveys radiating from Sydney to the west, the south, and the north, which have occupied his chief attention during the last twenty years.

There is a fact connected with this journey, and bearing on the practicability of making rapid and correct surveys, which is worth recording. Sir T. Mitchell has stated in this room, that the whole of this journey was laid down from measurements with the chain, and that he had frequently had from 25 to 30 miles thus measured in one day. Although himself unable to trace the course of the Victoria to its mouth or other termination, Sir T. Mitchell looks forward with confidence to the success of Mr. Kennedy, his assistant, who has been dispatched from Sydney for the purpose of tracing the further course of the Victoria, and who he believes will ere long be heard of as having emerged on the Gulf of Carpentaria.

It may appear discouraging to express a doubt on this subject, but when we recollect Dr. Leichhardt's account of the rivers which fall from the south into the Gulf of Carpentaria, I cannot hesitate to recommend geographers not to be too sanguine as to the successful termination of this expedition.*

Dr. Leichhardt.—It was stated in the address from this chair last year, that Dr. Leichhardt was about to start on a fresh journey of exploration into the interior, proposing to traverse the whole centre of the Australian continent from Sydney to Swan River. His plans and arrangements were made with great judgment and care, and principally from his own resources. Besides horses and beasts of burthen, the expedition was well provided with cattle to ensure a proper supply of animal food. Cheered by the enthusiastic good wishes of the population, no less than supported by his own energy and dearly-bought experience, everything promised that his journey would be one of the most important ever undertaken in that colony, and, besides opening up tracts of useful land in the interior, would lead to much scientific information. It was therefore with great regret that we lately heard that, after reaching the Downs of the Upper Mackenzie and Peak Range, Dr. Leichhardt had been compelled by events over which he

* Since the above was read, information has been received in England of Mr. Kennedy's proceedings. From this it appears that the Victoria was found not to go far northward from where Sir Thomas Mitchell left it; it then turns to the west; afterwards, for 120 miles, to south-west; and finally to south, where it is lost in a sandy, barren country, which Mr. Kennedy conjectures is the north-eastern limit of Sturt's desert. Mr. Kennedy advanced as far as latitude $26^{\circ} 25'$, when he was compelled by want of food and water to return. He thinks that the river will prove to be the Cooper's Creek of the latter gentleman. The country through which the Victoria flows is said to be barren and grassless.—June 1, 1848.

had no control to retrace his steps to Sydney. Nothing daunted, however, by his failure, this intrepid traveller determined again to attempt the solution of the problem, and to penetrate through the centre of the Australian continent. In the meantime he has not been idle, and while waiting for the proper season to make the necessary arrangements, he has been employed in making an excursion to FitzRoy Downs, for the purpose of examining the country between Sir Thomas Mitchell's track, and his own former route. He started on this expedition of the 9th on August last, and returned to Sydney about the beginning of October, having examined a considerable tract of country on the banks of the Dogwood Creek, the Balonne, the Colgoon, and the Condamine.*

In Mr. J. C. Byrne's work, entitled 'Twelve Years' Wanderings in the British Colonies, from 1835 to 1847,' will also be found some geographical details of the country, and much information respecting the habits and customs of the natives of Australia. The colonies described are New Zealand, New South Wales, Australia Felix, Van Diemen's Land, South Australia, and Western Australia. The questions of emigration and colonization are fully discussed—questions intimately connected with the progress of geographical discovery, and therefore not altogether foreign to the objects which we have in view.

Antarctic Seas.—During the past year we have seen the publication of the work of Sir James C. Ross, giving an account of his Voyage of Discovery and Research in the Southern and Antarctic Regions during the years 1839, 1840, 1841, 1842, and 1843. The merits of Sir James Ross have been already so fully stated in this room on a former occasion, when the Council awarded him the gold medal for the discoveries he had made, that I am not now called on to do more than to record the fact of the publication of these volumes, by which the fame of our intrepid countryman (at this moment starting on a somewhat similar expedition, with the noble object of searching for a missing brother in arms and fellow-labourer in the arctic regions), will be more permanently established, and the details of his exertions and his discoveries will be made known to all the world.

AMERICA.

Leaving the Old World, to notice the progress of geography on the American continent, I find, in crossing the Atlantic, that, after a silence of 50 years, the volcano of the island of Fogo, one of the Cape de Verde Islands, has again broken forth, and that torrents of burning

* Dr. Leichhardt is reported to have again started on his great expedition across the Australian continent.

lava issuing suddenly from its seven craters have caused considerable ruin and devastation.

Arctic Sea.—Beginning at the northern extremity of the continent, I will mention that Leopold von Buch has published at Berlin a notice of Bear's Island, known also on English charts as Cherrie Island, situated in lat. $74^{\circ} 80'$, chiefly taken from the accounts of the Norwegian naturalist *Keilhau*, who visited it in 1827. This notice contains some remarks on the origin of glaciers, and some interesting observations respecting the temperature and meteorological phenomena during the winter. The S.W. winds brought rain in December; whereas with N.E. winds the island was surrounded by solid ice in June and July.

North America.—*Dr. Rae.*—During the past winter information was received that the expedition dispatched from Fort Churchill, in Hudson's Bay, in 1846, under the command of Dr. John Rae, for the purpose of surveying the unexplored portion of the Arctic Coast at the N.E. angle of the American continent, had returned. They succeeded in tracing the coast all the way from the Lord Mayor's Bay of Sir J. Ross to within a few miles of the Straits of the Fury and the Hecla; thus proving Sir J. Ross to have been correct in stating Boothia Felix to be a peninsula. Dr. Rae has since returned to this country, and from him full details have been received of the results of this interesting expedition. They left Churchill on the 5th of July, 1846, and proceeded to Repulse Bay, from whence they succeeded in conveying one of their boats into the Arctic Sea, west of the Melville Peninsula; this operation being facilitated by a chain of lakes which greatly reduced the portages and rendered easy the carrying of the boat. Having quitted Repulse Bay in lat. $66^{\circ} 32' N.$, they again reached the sea in lat. $67^{\circ} 13' N.$, and after tracing the coast some miles to the N.W. to about $67^{\circ} 30' N.$, they crossed over to Melville Peninsula.

The prevalence of northerly winds and the state of the ice proving that the survey could not be completed this season, Dr. Rae determined on returning to winter at Repulse Bay, and preparations were accordingly made to build a house for the long cold winter, and to lay in a sufficient store of provisions, consisting principally of reindeer and salmon. With the exception of what was used for cooking their provisions, they passed the whole winter without fuel; the lowest temperature experienced being 47° below zero.

On the 5th of April they again started north, and on the 8th had advanced seven miles beyond Cape Lady Pelly. On the 18th, they found themselves near the latitude and longitude of Lord Mayor's Bay of Sir John Ross, in lat. $69^{\circ} 26'$, and on ascending a hill near the coast, Dr. Rae had the satisfaction of finding an ice-covered sea

studded with innumerable islands. As he observes—"Lord Mayor's Bay was before me, and the islands were those named by Sir John Ross, the Sons of the Clergy." Dr. Rae had thus the satisfaction of proving the existence of a continuous line of coast from the land N. of Repulse Bay to that part of Boothia Felix where Sir John Ross had terminated his inquiries in this direction.

Returning to Repulse Bay, the expedition again started north to trace the west shore of Melville Peninsula, and proceeded as far as lat. $69^{\circ} 30'$, when the state of the weather and of their provisions compelled them to return.

Arctic Expedition.—It is with regret that I have to repeat the statement of my noble predecessor last year, that we are still without information respecting the progress of the expedition under Sir John Franklin. The Esquimaux whom Dr. Rae fell in with had heard nothing of the exploring ships, it is therefore considered probable that they are somewhere to the north or west of Barrow's Straits; let us hope, however, that before the autumn this question will be set at rest by the return of our long-absent countrymen.

In the mean time it is gratifying to know that the Government, sharing the anxiety of the public to obtain information respecting their position, have adopted the most judicious measures for the purpose.

No less than three expeditions have been undertaken for their relief. Commander Moore, in Her Majesty's ship *Plover*, has been ordered to proceed through Behring's Straits in search of the missing ships, and is already, we may believe, well advanced towards that point. Sir John Richardson, with Dr. Rae, must by this time be threading his way through the American rapids on his route to the far M'Kenzie River, from whence he will proceed along the coast in search of his friend and former captain. And, thirdly, Sir James Ross and Captain Bird, in the '*Enterprise*' and '*Investigator*,' will shortly be on their old ground in the neighbourhood of Lancaster Sound, ready to act as circumstances may require. Thus it will be seen, for the consolation of those who have friends on board, that nothing has been omitted on the part of the Government which justice could require or humanity suggest. Nor must I omit to mention the munificent reward of 2000*l.* offered by Lady Franklin for the assistance of the vessels themselves, or the first information respecting them.

Arctic Seas.—Mr. Ch. Martens has published a memoir giving an account, from observations taken on board the corvette '*Recherche*,' between Lapland and Spitzbergen, of the temperature of the Arctic Ocean. The observations were taken at the surface, at great depths,

and in the neighbourhood of the glaciers of Spitzbergen. The result of these observations is, that the temperature of the ocean at all depths is generally above zero. The influence of the Gulf-stream extends to the western coast of Spitzbergen.

Hudson's Bay.—Some information respecting the manners of the Indians and the geographical features of the country will be found in Mr. Ballantyne's volume, called 'Hudson's Bay, or Every-day Life in the Wilds of North America during Six Years' Residence in the Territories of the Hudson's Bay Company.'

North America.—Sir George Simpson, the Governor-in-Chief of the Hudson's Bay Company's territories, in his Narrative of a Journey round the World, has, in addition to much interesting matter respecting countries already well known, given us some information respecting the regions to the westward of the Rocky Mountains, from the Russian possessions down to California. The Sandwich Islands are also fully described and discussed. The journey round the world was completed by returning home through Siberia and Russia.

United States.—From the Report made to the Secretary of the Treasury of the U.S. by Professor Bache, the Superintendent of the Coast Survey, we learn that the progress of that undertaking during the past year has been highly satisfactory. The work has been extended into eighteen States on the Atlantic and Gulf of Mexico. The results of the survey between New Orleans and Mobile are very important. Great advantage has been derived from the use of steam in the hydrographical part of the work.

The following are some of the results of the proceedings of the past year in the nine sections into which the work is now divided. The primary triangulation has been extended into the southern part of Maine. Astronomical and magnetic observations have been made at one station in New Hampshire and one in Maine. The topography of Boston harbour and its vicinity has been completed from Scituate Light on the S., to Nahant Neck on the N. The hydrography of the shoals near Nantucket has made considerable progress.

In the second section, viz. from Point Judith to Cape Henlopen, observations for difference of longitude by electric telegraph have been successfully made; and Washington city, Philadelphia, and New York are now connected by this novel and exact method, which in many cases will be an important aid in geodetic operations. Observations of tides and currents have been made in Long Island Sound and Delaware Bay. In the third section, the primary triangulation has been continued down the Chesapeake towards the Potomac; and the secondary

triangulation of the Chesapeake Bay has been carried on with the primary. In the fifth section, the preliminary reconnaissance of the coast of South Carolina and Georgia has been nearly completed. In the eighth section, a base-line has been measured on Dauphin Island at the entrance of Mobile Bay; the primary triangulation of Mississippi Sound has been extended; and astronomical and magnetic observations have been made at two stations, one at the entrance to Mobile Bay, and one on Mississippi Sound; and finally, in the ninth section, a reconnaissance of the coast of Texas has been commenced from Galveston southward, and a portion of it is so far complete as to admit of beginning the secondary triangulation and the astronomical observations.

The Report itself contains much valuable information respecting the detailed position of the different shoals and ridges discovered in various parts of the survey; also an able Report on the use of the electromagnetic telegraph for differences of longitude, and the methods employed to detect the time lost, if any, in transmitting the signals, and in measuring the distance between any two places connected by the electric telegraph. In the detailed account of the third section are some valuable observations respecting the temperature of the Gulf-stream; nothing can be more remarkable than the sudden rise from the cold water near the coast to the hot water of the gulf, forming what is called a cold wall confining the stream, the sudden changes according to the variation of the currents are also noticed.

Atlantic Ocean.—Maps and Charts.—Lieutenant Maury, director of the Observatory at Washington, has published Nos. 1, 2, and 3 of the charts of the winds and currents of the Atlantic. The voyage from New York to Rio Janeiro is said to have been reduced from 40 or 50 days to 29, by taking advantage of them. The same officer has also lately published a Report respecting the comparative advantages of the passage of the Isthmus of Darien as a means of direct communication between Europe and China; and he distinctly proves that, for rapid communication with China, the point of departure on the American continent should be Monterey, or some harbour in Upper California. Lieutenant Maury observes that it does not appear that the great circle route across the ocean has ever been considered as bearing upon the question of communication with China. This question cannot be solved by reference to charts or maps, in which the relative positions of places are necessarily distorted, but can only be seen on a terrestrial globe, by which we find that the shortest distance between any two places, not on the equator or on the same meridian, is along the arc of the great circle (of the globe) in the plane of which the places are

situated. "If," he says, "we take a common terrestrial globe, and draw a string tightly across it from Panama to Shanghai, it will show the shortest distance between the two places, and will represent the great circle route between them; and this string, so far from touching the Sandwich Islands, will pass through the Gulf of Mexico, thence through Louisiana towards Oregon, crossing the ocean several thousand miles to the N. of these islands. The distance by this route, were it practicable, is 1200 miles shorter than by way of the Sandwich Islands. It is, moreover, a fact that by this route a person at New Orleans is 300 miles nearer to China than when he starts from Panama by way of the Sandwich Islands, although he will have travelled 1500 miles to reach Panama." The numerous advantages pointed out by Lieutenant Maury, and detailed in his letter published in the 'Athenæum' of May 6, 1848, are so great, and the importance of rapid communication between China and the N.W. provinces of America is so manifold, that the project appears to be deserving of serious consideration. It is proposed that it should be completed by a railroad from Memphis to Monterey, one being already commenced from Charleston to Memphis. In the mean time Lieutenant Maury recommends a horse post from Memphis to Monterey. It is unnecessary to point out further the great advantages which would accrue to geography by this rapid communication. As connected with this question, I may state that a paper was read not long ago by Mr. Joseph Glynn before the Institution of Civil Engineers, giving an account of the various plans proposed for connecting the Atlantic and Pacific Oceans by a navigable canal, in which the relative advantages of the three plans, and the parties by whom they have been respectively advocated, were explained:—1, to cross the Isthmus of Tehuantepec; 2, to ascend the river St. John and the Lake of Nicaragua; and, 3, the Isthmus of Panama. The last presents fewest obstacles.

California.—Dr. Coulter has recently published a work in two vols., entitled 'Adventures on the Eastern Coast of South America and in the Interior of California.' Besides the description of the country on the main, the work also contains information respecting many of the groups of islands in the Pacific.

Mexico.—It is to be hoped that the war between the United States and Mexico will lead to the construction of improved maps of many portions of the continent of America hitherto but little known, particularly of the northern and western portions of Mexico and California. Not only do the necessities of war require correct maps, but the mere presence of the American army, with many intelligent engineer officers,

must lead to practical results in this respect. In the mean time Mr. G. F. Ruxton, a Fellow of this Society, has published a work entitled 'Adventures in Mexico and the Rocky Mountains,' from which many important facts and much useful geographical information may be gleaned, although written in a light and easy style, without any claim to scientific detail. His descriptions of the wild country through which he passed, and the still wilder inhabitants whom he met with, are animated and lively, and cannot fail to be read with interest.

To a certain extent the war between the United States and Mexico has already rendered some service to geography, for amongst the documents accompanying the last message of the President of the United States to the two Houses of Congress, on the 7th of December, 1847, are many observations respecting the geography of Upper California and Mexico, with maps and plans on a large scale. I regret that I cannot do more than allude thus briefly, on the present occasion, to a volume containing 1600 pages.

West Indies.—I have here to mention Sir R. Schomburgk's work on the History of Barbadoes, published in 1848. Although not entirely geographical, it contains so much matter directly connected with our science, that it deserves honourable mention on this occasion. The first part contains a geographical and statistical description of the island, in which the author enters fully into the climatology and meteorological phenomena of Barbadoes, graphically describing the hurricanes to which it is subject, and concluding with a minute description of the political and local geography of the island. The second part is devoted to the History of Barbadoes from the settlement of the island to the year 1846. It commences with a valuable and interesting description of the early maps of the island. It appears to have been first mentioned under the name of Bernados, in a MS. map of the world now in the British Museum, drawn on vellum, and supposed to have been executed in the time of Francis I., previous to 1536. It was subsequently called Bernados, Barnodo, and Barbudos. The third part contains remarks on the geological structure of the island, with a sketch of its natural productions.

Panama.—Captain Kellett, in the *Herald*, is continuing the survey of the coast between Panama and California. Great attention is being paid to the Panama portion of the survey, as many rivers come down to the coast from the mountains in the back, whilst others descend from the eastern side. It is stated that the river San Juan runs to within a quarter of a league of the Atrato, a river on the opposite side, navigable for large boats. Such a discovery would go far towards

facilitating a passage across the isthmus, and might supersede the unsafe anchorage at Chagres.

In the volumes of Mr. M'Gregor, late Secretary to the Board of Trade, the progress of America is fully developed. It is a work of great compilation and research, bringing together everything known respecting the geography and political history, and moral condition of the people of the different States now established in that vast region.

New Granada.—Maps.—Colonel Joaquin Acosta has lately published the first special map of the republic of New Granada which has yet appeared. It is said to contain many important corrections. Carthagena is placed in $77^{\circ} 54' 25''$ W. long., instead of $77^{\circ} 50'$; and upwards of one thousand places are fixed, not given in any former maps.

Santa Fe de Bogota.—M. Lewy left France in 1847 to occupy the chair of professor of chemistry and metallurgy at Santa Fe de Bogota; owing to his character and advantageous position, much information is expected from him respecting the physical geography of New Granada. Full instructions have been given him by the French Academy of Sciences to observe latitudes and longitudes, temperature, &c.

Chili.—M. Claude Gay has published, in Spanish, a work on the physical and political history of Chili, the result of twelve years of laborious toil. In this work the geographical features of the country have claimed and obtained a full share of M. Gay's attention. The work is accompanied by an atlas in folio. The geographical distribution of plants has also deeply engaged the attention of the author.

An interesting description of some of the features of the great rivers which traverse the plains of South America will be found in Captain Mackinnon's account of steam-warfare in the Parana, although the work itself does not claim to be classed amongst those of a strictly scientific character.

MISCELLANEOUS.

Ethnography.—The languages and histories of nations are not to be overlooked in detailing the progress of geography; I have therefore considered it my duty to call your attention to the work of Mr. Horatio Hale, philologist of the exploring expedition under Captain Wilkes, U.S.N., on the subject of migrations in the Pacific Ocean. The work is called 'Ethnography and Philology of the U.S. Exploring Expedition,' and appears well deserving of consideration. The whole question of the manners and dialects of the Polynesian races is thoroughly discussed, and the author comes to the conclusion, founded moreover on

the labours of Wm. von Humboldt, that the Polynesians belong to the same race as that which peoples the East Indian Islands; many of them, indeed, directly refer their origin to Bouro, the easternmost island of the East Indian Archipelago, inhabited by the yellow Malay race.

Mr. Wm. Hughes has published a small pamphlet, entitled 'Remarks on Geography as a Branch of Popular Education, chiefly with reference to the principles on which it should be taught in Normal Schools.'

Earthquakes.—In the 25th volume of the 'Comptes Rendus' will be found an account of an earthquake felt at Copaiipo (Chili), 19th January, 1847; also of an earthquake felt at Fécamp, 10th July, 1847.

Some interesting details respecting earthquakes were mentioned at the meeting of the British Association at Oxford last year, amongst which was a report on the theory of earthquake movements, by W. Hopkins, Esq.

Mr. Mallet, of Dublin, has also contributed much information on the same subject, and is now engaged in a series of experiments to solve some of the important questions respecting the undulations of the waves which accompany these phenomena.

Professor Savi, of Pisa, has also published a work on the phenomena observed during the earthquakes of Tuscany in August, 1846.

Professor Noeggerath, of Bonn, has published a collection of all the details respecting the earthquakes felt in Germany in July, 1846, from which he has calculated the focus of those shocks to have been situated on the Rhine between Bingen and Coblenz.

Hakluyt Society.—It would be a serious omission on such an occasion as the present, and in these rooms, not to call your attention to a Society which belongs so especially to our science as the Hakluyt. Although we do not expect novelties or discoveries from them, they are yet capable of conferring great benefit on our pursuits by their republication and translations of old works of travels now out of print, or only to be met with in foreign languages. I may mention that they have already published, 1, 'The Observations of Sir Richard Hawkins, Knight, on his Voyage into the South Sea in the year 1593,' and, 2, 'A Translation of Select Letters of Christopher Columbus, with other Original Documents, relating to his Four Voyages to the New World.'

Geographical Distribution of Plants, &c.—Besides the notice on this subject published by C. Ritter, in his 'Erdkunde v. Asien,' respecting the coffee plant and the date palm, I must mention that Mr. H. C. Watson has also published an elaborate work on the geographi-

cal distribution of British plants, entitled 'Cybele Britannica, or British Plants and their Geographical Relations.' His work, although confined to a small portion of the earth's surface, is valuable inasmuch as it points out how much there is to be done on this subject, one so intimately connected with physical geography, and to which the attention of A. Von Humboldt and others has been so successfully directed.

Geographical Nomenclature.—Our late Secretary, Colonel Jackson, has addressed a letter to M. Jomard on the important question of simplifying geographical nomenclature; entirely coinciding in the views already put forth by that writer. Of the importance of such a measure there cannot be a second opinion, the inconvenience of the present system is self-evident, when each country adopts peculiar forms and measurements, different terms and methods of description, and when even the writers of one country do not all agree in the expressions intended to define certain positive facts; it is not difficult to imagine the discrepancies which must constantly arise, not to say the impossibility of reducing their observations to one common form. But it is easier to point out the evil than to devise a remedy, and I fear the aspirations of those who recommend these measures, will be deferred until we enjoy the advantage of one common language and one universal form of a monetary system.

CONCLUSION.

Having thus endeavoured to lay before you a comprehensive view of the progress of our science during the past year, I cannot but feel conscious that, notwithstanding the length to which it has extended, I have made many serious omissions, and that much remains to be said upon some of the most important subjects of our science in its higher and more scientific branches, such as the progress of magnetism and meteorology, terrestrial physics and astronomy, all of which are now brought within the immediate province of the geographer, and are become some of his chief qualifications; but they require to be dealt with by a master hand. Much also remains to be said respecting the application of geography to the moral wants and political and social education of mankind. It would be a serious evil to imagine, as I fear however is the case with many, that the science and aspirations of geography are completed, when we have attained a perfect delineation of all the continents and oceans of the globe, with their bays and islets, their rivers and their mountains, and have correctly fixed the position of all those physical features which constitute the surface of our earth. Such, indeed, is but the commencement of our labour. The most correct and perfect

maps are but the skeleton or groundwork of our science, taken in the higher and more extended sense in which we wish to see it cultivated. Its application to the progress and development of civilization, and of the animal and vegetable productions of the earth, to the distribution of the different races of the human family, and the various combinations which have arisen from their repeated intercourse, are subjects of the highest consequence, and for the clear understanding of which our maps and charts can only serve as the foundation-stone. No doubt the commercial intercourse of mankind is facilitated and kept up by these maps and charts; but we aim at a higher object, viz., the improvement of man's moral culture by a more extended knowledge of the various productions of different climes, and by bringing before him on a large tabular scale the moral and physical condition of his race. To such purposes as these, maps have, with few exceptions, been as yet but rarely applied; but the movement has begun, and let us hope that the object will now not be lost sight of. That the Royal Geographical Society of London should assist in promoting such an object must be the first wish of its friends and its supporters. But to do this, its influence must be extended, its members must be increased, the sphere of its utility must be enlarged. The colonies and possessions of Great Britain extend to every quarter of the globe. Her ships navigate every shore, and her sons are foremost to explore every corner of the globe. In no country, then, are there such facilities for amassing and collecting geographical information. Let us hope that the Royal Geographical Society, encouraged as it must be by the practical and positive evidences of public support, will speedily find the means of arranging and systematising this mass of information in such a manner as to meet the requirements of the public, and to fulfil, in part at least, the original intentions of its founders.

PAPERS READ

BEFORE THE

ROYAL GEOGRAPHICAL SOCIETY.

- I.—*Journal of a Steam Voyage to the North of Baghdád, in April, 1846.* By Lieut. J. T. JONES, commanding the Hon. East India Company's Steam-ship 'Nitocris.' Read March 8, 1847.

[The orthography of the Author of this Paper has not been strictly adhered to, but it has been made nearly to correspond with that of the map in vol. ix. of the Society's Journal, which will serve to illustrate the following voyage.—Ed.]

THREE years having elapsed since our former ascent of the Tigris above Baghdád, and anticipating, from the early rise of the water, a more favourable season and better success than we experienced before, arrangements were made for ascending the river early in March; but our departure was unavoidably delayed until the 2nd of April, when the river had become considerably more rapid, from the high rise having already set in. We left Baghdád on the above day, and, passing through the bridge of boats, reached Turumbah and Kádhomein, the former at 10:35, the latter at 10:55.

The banks of the river at this time presented a beautiful appearance, the gardens exhibiting a diversity of trees of variously-tinted foliage, and a delightful fragrance pervading the air from the now opening orange-blossoms. At 1:45 arrived at Sheri'at el Beidha, on the right bank; 2:33 Tel Kúsh, a mound on the right bank, bore W. The country to the N. of Tel Kúsh, between Khán Suweidiyah and the river, is known by the same name as the Khán; but the Khán is also sometimes termed Tarmiyah, from a lake situated in an old bed of the Tigris called Shat el Aïdhá. This is now dry, and is reported to be of the same width as the present river. 5 P.M. Khán Suweidiyah bore W. and Jedideh E.N.E. Many mounds of considerable size are to be seen S. of Khán Suweidiyah, probably the Tel Kheir of Lynch's map, but I searched in vain for the S. end of the Shat el Aïdhá, which is represented as joining the present river near this spot. I am informed, however, that it is lost in the desert near this. Arrived at the Khán Jedideh at 5h. 3m., but finding the stream very rapid, proceeded on for twenty minutes, and anchored near the old Khán of the same name.

The gardens to the N. of Baghdád terminate abruptly about two miles above Kádhomein on the right bank, but on the left,

after leaving Moádhhem, scattered villages and date-groves are seen as high as Tel Kúsh, whence to Jedideh the country, at present, is highly cultivated with wheat and barley. On both banks mud enclosures are met with every two or three hundred yards, in which the cattle used for the purposes of irrigation are kept; while numerous round isolated towers, affording shelter from marauding parties, attest the weakness of the present Government. The old adage of "the sword in one hand and the plough in the other," is here literally verified.

April 3rd.—Left our anchorage at 5.38 A.M., the river having risen during the night 8 inches, with a cold northerly wind, therm. 43°. Passed the villages of Howeish and Mansúriyah, the former at 6h. 40m., the latter at 8h. 15m., when it bore E. on the right bank and W. of Mansúriyah. The Tarmiyah, or ancient canal, leaves the Tigris, and another large canal, bearing the same name, and said to be of more ancient construction, is seen about 1½ mile below. This has been long dry, but the northern canal, during the period of high water in the river, still receives a portion of the Tigris, and is lost in the marshes W. of Kaḥhimein. Its direction by compass was observed to be 244°. The river near Mansúriyah is broad, but broken by islands. A khiyát, or wall, is situate a little to the N. of the Upper Tarmiyah, having an old khán in ruins close to it. 9h. 11m. passed Sa-dêyah village and grove of date-trees, the country every mile becoming more elevated and the valley of the Tigris beginning to assume a distinct form. Reached the village of Sindíyah at 10h. 33m. and received twelve hours' fuel. Remained here until noon to obtain observations, which place the village in lat. 33° 52' 50". The whole of the gardens and date-groves from Jedideh to this place are irrigated by the Khalis Canal, which, with the Dujéil, are the only canals of importance that the Páshalic can now boast of. A sad picture for contemplation is afforded by the remains of so many noble works of the same kind lying scattered around neglected and abandoned, showing at a glance, without the aid of history, the once flourishing state of this celebrated country.

Left Sindíyah at 12h. 10m. P.M. and at 1h. 35m. observed it to bear 137°. At this spot the high cliffs, forming the valley of the Tigris, abut on the left bank of the stream, and the large canal of Nahrawán is seen above them about a mile and a half distant, trending to the S.E. From this point the river runs in a more westerly direction, and at 3.10 passed some cliffs (about 50 feet high), on the summit of which a part of the Nahrawán is observed to have been cut away by the force of the current encroaching on and undermining the soil on which it stands. The cliffs forming the right bank of the river are distant from

this spot about 5 miles. A long alluvial deposit projects from them to within 100 yards of the left bank. This space only is now occupied by the river. The tomb of Imám Sayyed Mohammed bears from this point 262° . This also is the general direction of the river 'A'dhem. The river of Nahrawán is also known here by the name of El Dojúi. At 3h. 35m. anchored off a small branch of the 'A'dhem to obtain observations.

The western branch is larger and 2 miles distant from this; it now appears a considerable stream, though when I passed it in March, 1843, it deserved little notice, but the heavy rains of the last winter have increased its importance. After passing the 'A'dhem the river becomes more tortuous: a long reach extending to the S.W. leads to an opening of considerable extent, which is said to be the mouth of the Shat el Aïdhá, and supposed to be the old bed of the Tigris. We passed it at 6h. 15m., and stood towards Khán Tholíyah, in a northerly direction. Anchored for the night at 6h. 32m. P.M. near two islands which here bisect the stream.

The alluvial soil here gives place to banks of pebbles and shingle, occasionally mixed with conglomerate masses, but the high cliffs still exhibit alluvium mixed with many strata of sand and, in some places, red clay. A salt stratum is observed near the present margin of the stream, in which sprigs of the tamarisk flourish, but the rest is bare and much eroded, not only by the Tigris, but by the numerous torrents which find their way from the high lands contiguous to the Hamrín range. The háwís, or alluvial deposits formed in the valley of the Tigris, are now in a high state of cultivation. Obtained observations both for longitude and latitude; the latter, deduced from the merid. altitude of Antares, was found to be $34^{\circ} 0' 19''$ N.

April 4th.—At sunrise took several bearings. From this station the mouth of the old bed of the Tigris or Shat el Aïdhá bears S. by E. $1\frac{1}{2}$ mile distant, which would make the bottom of the reach S. of Khán Tholíyah in lat. $32^{\circ} 59'$ nearly; consequently, if my latitude be correct (which I have no reason to doubt), the delineation of this part of the river in Lynch's map is scarcely carried far enough to the S. It is difficult, however, to speak with certainty, as the map in my possession is on a very small scale, reduced by Arrowsmith from Lynch's original of 12 inches to a degree. Captain Lynch's fixed stations are, however, very accurately determined. During the night the river rose 8 inches, occasioning the banks to fall in with loud reports; thermometer 42° at daybreak.

Left our anchorage at 6h. 9m. A.M. and crossed over to the háwí on the left bank and procured some fuel, and pursued a northerly course towards Khán Tholíyah. I may here mention a

trait of Arab rapacity indicative of their general character. Some of the Jebbur Arabs had been assisting us in carrying our fuel, and I presented them with some ball cartridge in return. Scarcely, however, had they reached the party to whom they were to have been presented when one and all made a general scramble. The person to whom I entrusted the cartridges, finding it now impossible to distinguish those who had earned them, threw them down, and such a scene ensued as could only be told by any unfortunate traveller who might fall into such hands, as assuredly his garments or any other property he might possess would be thus contended for. Swords were drawn and sticks of no ordinary dimensions whistled through the air, and, when we left them, the excitement appeared as if it would last throughout the day.

The stream as we approached the neighbourhood of Khán Tholíyah became more rapid; our progress, therefore, was proportionately slow. At 9h. 50m. the Khán bore N.E. $1\frac{1}{2}$ mile. From this the river pursues a westerly direction to Khán Mizrakjí, and from thence to El Káim, a little more northerly; at noon Belid, on the Dijeil, bore 182° , Khán Tholíyah 89° . At 1h. a tomb in the bed of the Nahraván, called Ímám Sayyed Hosein, bore N. $1\frac{1}{2}$ mile distant. A small branch of the Nahraván is also here called Sidd-el-Aziz; at the above time, Belid bore 169° and Tholíyah 99° ; Khán Mizrakjí, a place of accommodation for pilgrims on the road to Samarra, N., and at 4 P.M. N.E. This is the nearest point to the Kháli, or Sidd Nimrud, or Median Wall. I visited it in 1843, but it is so well fixed and described both by Captain Lynch and Dr. Ross in the Journals of the Royal Geographical Society, that I need not further allude to it. 5h. 45m. came to an anchor for the night. Nothing but the greatest perseverance and attention to the steerage of a steam-vessel through such intricate passages as we have had to-day could ensure her making any progress. From Khán Tholíyah the bottom has changed to a hard shingle, over which the current runs at the rate of $6\frac{1}{2}$ geographical miles per hour. The bed of the river is full of islands and shingle shoals, and as there is, at this season of the year, but one channel of sufficient depth, which receives the whole stream, it occasions where thus confined considerable falls or rapids, some of which, notwithstanding a heavy S.E. wind set in, enabling us to make sail, we could scarcely surmount. The engines, indeed, appear to be paralysed when on the top of a rapid, as the revolutions decrease from 29 to 23. This I can only account for by the weight of the vessel in her ascent acting against the momentum of the paddles; in fact, the small diameter of the wheels is not calculated to lift as well as to propel the vessel up an inclined plane.

The country passed through to-day was extremely beautiful. The undulating hills forming the valley of the Tigris are now clothed in their spring garments; waving grass, intermingled with flowers of every hue, forms a rich landscape which the eye is unaccustomed to meet in the alluvial plains below. Perpendicular cliffs, composed of masses of conglomerate, laid bare by the abrasion of the stream, seeming to threaten the destruction of the vessel, should they fall, are happily contrasted with their carpeted summits. The háwís of alluvium, projecting from the various points of the valley of the Tigris, are highly cultivated by the Jebbúr Arabs on the E. and the Mahjammah on the W. Obtained some good bearings and angles from the mast-head. Shortly after sunset the S. wind fell, and heavy rain followed with thunder and lightning, but before morning the sky again became clear.

At sunrise on the 5th resumed our route, contending against a heavy stream of 6 knots an hour, and occasionally slight rapids in the narrow channels. Obtained our fuel at Kádisiyah at 7h. 48m.

While taking in wood, I visited the remains of the old fortress and city of Kádisiyah, situate about 1 mile from the river. I never had so agreeable a walk. The country is literally covered with wild grass of every sort in full blossom. Flowers of every tint and hue were crushed beneath our feet, and the very air was perfumed by them. The city is of an octagonal form, with round towers at each angle, between which 16 buttresses or bastions are placed, 37 paces distant from each other. A gap exists in the centre of either side, which no doubt held the gates of the fortress, but all traces of these are now gone. The wall by measurement was originally 50 feet in thickness, and is at present about 25 feet high. Its interior face must have comprised an entire range of vaulted chambers, one of which is still uninjured, and affords a good specimen of the general structure. It is built of sun-dried bricks, 18 inches square and 5 thick. No buildings at present exist within its area; but on a minute examination, at one-third the distance across the interior from its western side, I discovered the traces of a wall which extended from the southern ramparts in a line due N. for 1240 paces. This line of wall at the distances along it of 700 and 790 paces, and at its termination, had other walls, connected with and extending from it at right angles, or due E., for 450 paces, where they break off abruptly. A perfect oblong enclosure of 250 paces long from N. to S., and 100 broad, occupied the space between the northern parallels. A high mud rampart appears to have surrounded the town, leaving a space between it and the outer defences, 70 feet wide. The great canal of the Nahrawán is seen stretching far to

the eastward, and passing within 200 yards of the N.E. angles of the fort. A hand, or cut from the Nahrawán, about 1 mile N.W. of the city, watered the country between it and the Tigris, and ran along the W. face of the fortification, throwing out a branch in a S.S.E. direction, at a short distance below its junction with the Nahrawán. This offshoot entered the fort at its N.W. angle, and ran in a S.S.E. direction to the angle of the city wall, where it bifurcated, one branch passing along the N. face of the city, while the other, running parallel with the western wall for 640 paces, suddenly turned to the east through an opening in it. After supplying the town, I presume both this and the southern branch must have been employed in irrigation. It is probable indeed that the whole space between the walls of the city and the outer defences contained gardens, for no mounds of any size or extent are to be met with, which could lead us to conclude that buildings of any importance existed there.

From the S.W. angle of Kádísyah observed bearings. There can be no doubt, I imagine, that this city was one of importance during the flourishing period of the Khalifate, and probably owes its decline and subsequent abandonment to the decay of that vast canal, the Nahrawán river. A small oblong enclosure, called El Sanam (the Idol), existed formerly on the summit of the cliffs now washed by the Tigris, but only half of it at present remains, the river having swept away the remainder; the walls, however, on the face of the cliffs, are plainly distinguishable, and, unlike Kádísyah itself, are built of fine kiln-dried bricks; no inscription or sculptures are to be seen there. The half of a statue (whence the enclosure has its name) of black stone, similar to that of Egypt, was found here some years ago, and is now in the possession of Dr. Ross. The latitude of Kádísyah by a meridional observation of the sun is $34^{\circ} 4' 38''$.

On the high land forming the western valley of the Tigris, and immediately opposite to or due W. of Kádísyah, there are the remains of a neat square town of some extent, called Istábolát (stables). The streets and buildings can be traced by a great number of parallel mounds, and broken brick walls at right angles with each other. A ruined wall of kiln-dried bricks and a ditch surround it. The Dijeil leaves the Tigris close to this place; its northern and more ancient mouth is now dried up. It has a S.E. direction, and after passing the end of the Median Wall and the villages of Harbah and Sumeichah is finally lost near the Tarmiyah water. The country is now considerably more elevated.

Having got a meridian observation, we continued our course at 12h. 15m. passing the head of the Dijeil and Istábolát, and at 12h. 45m. El Kaim. Saw a solid quadrangular tower situated at

the head of the S. branch of the Nahráwán. It is certain that this magnificent canal had two large branches, from which it received its supply of water, and by some it is imagined that a small canal, called the Nahr Háfeh, having its mouth at the foot of the Hamrin range, where it is severed by the Tigris, might be called a third. The Nahr Háfeh, however, is much smaller than the other two branches. It joins the centre one near the Kantarah el Resás, from whence this main branch pursued a S.E. direction, meeting the branch from El Káim, which flowed in a more easterly direction a little above the junction of the 'A'dhem with the Tigris. From this spot they became one united stream, considerably more elevated than the surrounding country, and pursuing an uninterrupted course S. eastward over the 'A'dhem, the Diyálah, and the present bed of the Tigris, it formerly fertilized the immense plains of Irák by its many ramifications to the neighbourhood of the Persian Gulf.

An opening to the S. of El Káim, I have since heard, is a duct from this splendid work. In March 1843, I visited the junction of the two larger branches where the remains of a "Sidd" or "band" still exist. A tower must also have stood on this site formerly, for the ground was strewn with remains of buildings, glass, and pottery. Opis is represented by some as having occupied this position, but I hardly think that opulent city could have left no further traces of its existence than the insignificant remains here met with at present.

From El Káim to Sámarráh the ascent of the river is very difficult. The fall or inclination of its surface is plainly visible to the eye. Opposite to El Káim a single fall took us forty minutes to overcome, and had we not been assisted with a westerly wind, which enabled us to make sail, our further progress would probably have been stopped.

Reached Sámarráh, April 6, at 7 A.M. The modern town, situate on the cliffs forming the left bank of the Tigris, is now encircled by a strong wall built at the expense of the influential Shíah population from India. When I visited it in 1843, this wall was just begun. The town was previously open, and suffered much from the demands of the Bedouins. They used to encamp outside and threaten to pillage the place if their demands were not complied with; it is, however, now secure and free from such visits. But a great oversight has been committed in not extending the walls to the margin of the cliffs overlooking the river, for the Bedouins could at any time destroy the aqueduct which conveys water to the town, and thus, by cutting off the supply of this necessary article, compel the inhabitants to come to terms. It is, however, on the whole, a miserable town, and owes its importance chiefly to two handsome tombs surmounted by cupolas, the

larger being that erected over the remains of the Imám Husein 'Askarí. It has recently been repaired, and, I believe, was formerly covered with gold, similar to the cupolas at Kádhomein, Kerbelá, and Nyaf; it is now perfectly white, the present funds not being sufficient to give it its former splendour. The smaller cupola, or that of the Imám Mehdi, is very pretty, being beautifully enamelled with yellow and white flowers on a bluish-green ground. Mehdi was the last of the Imáms revered by the Shi'ahs, and is said to have disappeared from the earth at this spot. A large hole, over which this edifice is erected, points out the place from which it is also believed he will at some future period re-appear. It is therefore much venerated by Mohammedans, especially by the Shi'ahs. Pilgrims from all parts of Persia resort to this place annually. I am informed that 10,000 is the yearly average of the number of those who visit this sacred spot, but I am inclined to believe this amount is even under the truth. No tax is levied on the pilgrims, but the proprietors of the kháns and houses, in which they reside, pay to the government 2 Riega piastres for each individual. The modern town comprises about 250 houses, with a Sunni population slightly under 1000, who possess among them barely 100 stand of arms. The town is farmed by the government this year to the present Zábít Seyyid Husein for 280,000 Riega piastres, a sum nearly equal to 660*l.* sterling.

About half a mile to the N. of the modern town a curious spiral tower is situated. It is called the Malawiyah. I ascertained its height to be 163 feet, as near as possible. From its summit a fine view of the extent of ancient Sámarráh is obtained. Heaps of bricks, glass, pottery, and fragments are strewn in every direction, and the outlines of many edifices are plainly distinguishable. The former town is said to have been watered by a tunnel cut under ground, having its mouth in the neighbourhood of the Hamrín ranges. Traces of this tunnel are still to be seen in the remains of the wells (named Kámát or Káriz) descending into it. Both the Malawiyah and the remains of an oblong building (a Jámi' or Medreseh) close to it, are built of fine bricks, and with the greatest neatness. The Medreseh is about 810 feet in length and 490 broad, having 12 buttresses between the corner bastions on its N.W. and S.E. faces, and 10 on its N.E. and S.W. sides. The great entrance faces the Kéblah, and shows at once its Mohammedan origin. A fountain appears to have existed in the centre of its court. Its walls are at present about 30 feet high, and on its S.W. side the remains of arched windows are discernible. To the N.N.W. of the Malawiyah, about 2½ miles distant, are the remains of the Palace of Mótasim, the eighth Kaliph of the Abbasides. Its entrance is now all that is left standing. The ruins around occupy a large space, and have vaulted chambers beneath

them. Many an idle tradition is attached to these subterranean apartments by the Arabs, and, moreover, Beckford's 'Vathek' owes its origin to this place. During our visit to it in 1843 we descended into the vaults by means of a rope and block, much to the dismay of the frightened natives, who would not trust themselves near the spot, but awaited the termination of our enterprise with a superstitious dread. They firmly believe that a lion has chosen this place to hold his court in, and when we again made our appearance on "terra firma" scatheless, they thanked God for our deliverance. The vaults are of some extent, and cut out of the limestone rock, but have brick roofs. A few scraps of old and much rusted iron and a fathom or two of decayed rope rewarded our labours.

The site of the ancient Sámarráh was undoubtedly well chosen. The broad and rapid Tigris bounded it to the W., the S. branch of the Nahrawán extending from the Kantarah-el-Reşás to the river 'A'dhem on the N., and the N. branch of the Nahrawán extending from Al Káim in an easterly direction to its junction with the other branch on the S., thus enclosing a triangle of rich land, whose longest side was 35 English miles, and the remaining two 20 miles in length. Many towns occupied this area, and the numerous canals, offshoots from the great Nahrawán, crossing it in a diversity of lines, attest its former cultivation. At this time not a blade of grass or a single tree breaks the monotony of the extensive view from the top of the Malawiyah; a death-like silence prevails around the fallen city, interrupted only by the howling of a jackal, who has just issued from some of its deserted vaults.

W. by N. of the palace, and on the undulating mounds which form the right boundary of the valley of the Tigris, another ruin, apparently of the same character and date, is seen. The buttresses, which occur at regular intervals along the walls, and are partly standing, give to the whole, when viewed at a distance, the resemblance of a group of columns. These buttresses are circular or square pedestals neatly built of fine brick-work. It is called "Ashik," or "the lover." Some high mounds in the valley of the river, about half way between the palace and this ruin, or rather nearer to the latter, mark, I think, the site of some very ancient ruin, probably Babylonian. The Arabs, however, call them "Máshúkeh," or "the beloved;" and a bridge over the Tigris is said to have formerly connected them together, notwithstanding which, tradition has here preserved a tale similar to the well-known feat of Leander.

About four miles N. of the modern town of Sámarráh, a high tumulus stands in the plain. It is called Tel Alíj, or the "nose-bag mound," and is said by tradition to have been raised by some former ruler ordering his troops each to bring the nose-bag

of his horse full of earth for this purpose. It exactly resembles the tumuli to be met with in Syria and in the plains of Shahrázú, near Suleimániyeh.

6th.—At 9h. 55m. A.M. left Sámarráh, and had hardly proceeded an hour before we grounded on a pebbly shoal. From Sámarráh to this place we had been struggling hard against the violence of the stream, and had nearly surmounted a fall of water over a shoaly spot, when, the engines losing their power, the vessel's keel touched the ground, and in an instant she was thrown on the bank, with her port broadside exposed to a stream running nearly 7 geographical miles per hour. I have been many times aground both in the Upper Euphrates and in this river, but in a worse position than this I was scarcely ever placed.

The shore was 290 yards distant, and the dropping of anchors in the stream, from long experience was known to be useless, as, from the hardness of the bottom, they came home with the slightest strain. After 6 hours' hard labour, we succeeded in getting an anchor buried on shore, and a chain of 150 fathoms attached to it brought off across the rapid stream to the vessel. We now thought the heaving-off certain, and were congratulating ourselves on our success, when the chain snapped in two, and the vessel swung round with a heavy crash as if her bottom was stove in, her head down, and the starboard broadside now receiving the whole weight of the stream. We tried in vain to connect our chain again during a heavy squall of thunder, lightning, and rain, and at length desisted for the night. During the night the stream forced the lee side of the vessel higher up on the bank, while the weather side heeled over to starboard into deep water, occasioned by the heavy current acting against the vessel, and cutting or abrading away the bank below us. At daylight the port side of the vessel was nearly dry, while the water was within 18 inches of the starboard scuttles, and had we remained much longer in this position, she might have turned over, or perhaps filled when the water reached them. At dawn of day, however, we were again at work, and happily succeeded in connecting the chains. From that time till 1h. 20m. P.M. we hove at intervals a heavy strain, by which the vessel righted, and eventually came off the ground by allowing the stream to catch her on the opposite quarter.

Part of the Shammár Arabs under Nejiris are roaming about this part of the country, as are the Āl Bú Hamed (family or tribe of Father Ahmed). Large herds of their camels are grazing around, and enjoying the rich grass which abounds everywhere at this season. Some of the tribe approached the vessel when aground, and a Bedouin I have with me was sent to beg them to offer no molestation to our crew while burying the anchors on shore. Two of the party were present at the affray in which

Suleimán Mírzá lost his life, and in which our friend Tímúr was severely wounded by a spear which passed through his lungs. They inform us that the person who slew Suleimán Mírzá, by severing his head from his body at one blow, met his death a few days afterwards from an Ajeíl Arab when they attacked a caravan. They also profess to regret the circumstances attending the attack on the Princes, and say they have not known "good since." Their chiefs have been killed, "and their children have died, their favourite mares are barren and suffering from disease, and happiness has left their homes." Some English iron, I believe, belonging to Messrs. Lynch and Co., of Baghdád, was offered to us for sale, for a mere nothing. This had been plundered from a caravan a few months previously, and a common bottle taken from some of Suleimán Mírzá's party was tendered to us for the exorbitant price of 2 gházis (about 8s.). The former offer, I replied, I could not accept, as I too had iron for sale, and pointed to the 9 lb. shot, which Sayyed told me caused some amusement. The latter I did not want, and offered them as many as they wished for, which soon lowered the price of their commodity. These people appear to be the terror of Al-Jez'irah from their lawless habits. The Shammár, though feared, are much less dreaded.

8th.—The river rose 3 inches last night. We weighed at 6 A.M. with cloudy weather and a S. wind, which, should it freshen, may assist. At 7h. 17m. "Ashik bore W. three-quarters of a mile distant; Kahf-el-Kelb, some high mounds S. of "Ashik, 201°; Sámarráh 137°; Malawíyah 129°, with the mounds of Mas-hukah nearly in a line with it; the palace 112°. The river from this point trends more to the N.E. for a short distance along the cliffs forming the eastern boundary of the valley of the Tigris, thence N. to Shmás, some modern ruins which extend a considerable distance to near Abú Delif, a miniature repetition of the Malawíyah, which we passed at 11, a moderate S. wind materially promoting our progress. At 1h. 10m. we arrived opposite the mounds of Mehjir and the Kantarah-el-Reşas, signifying "the bridge of lead," and although not actually a bridge, in our acceptance of the word, but a dam to confine the water in the dry season, it might have answered both purposes, or the name may be more probably modern and brought into use only since the decay of the canal.

Many encampments of the Shammár on the right bank near Haweşilát were passed. They extend nearly up to Mosúl. These people are, however, migrating towards Baghdád, as Sufúk, the chief Sheikh, advances to the S. The parties of Nejiris and Sufúk are not now on friendly terms, owing to the Páshá of Baghdád (Nejib) having invested the former as sheikh of the tribe, while the latter claims it as a right. Ahmed-el-Kádí (a connec-

tion by marriage of Sufúk) informed me this morning that the 'Abeid once possessed the whole of Northern Mesopotamia, and that the present Shammár usurped the country. He says:—"Two Shammár families, with their tents, originally wandered from Nejd, and after some time encamped with the 'Abeid. Among the chattels of the new comers a wooden bowl of extraordinary dimensions was observed, but it excited no further curiosity till the strangers invited some of the then holders of the soil to a feast, when the bowl was set before the guests filled with mutton, butter, and the usual ingredients of Arab fare. The dinner was duly despatched, and the 'Abeid, on returning to their tents, were talking of the munificence of the strangers and the unusual dimensions of the wonderful bowl. A greybeard of the tribe who had not been at the feast listened in silence for some time, when starting up, to the dismay of his friends, he demanded that the newly arrived strangers should be immediately put to death, adding, with the air of a prophet, that the famous bowl told a story in itself, and that ere long many strange fingers would be dipped into it. It literally happened as the old man had foretold. His voice was over-ruled in the assembly, and the strangers' lives were spared. A few months afterwards Shammár after Shammár arrived and feasted from the much-dreaded bowl. A few years sufficed for the total expulsion of the 'Abeid, and instead of being lords of the soil, that once powerful tribe became Felláhs and slaves to the formidable Shammárs." Such was Ahmed's account of the origin of the Shammárs in Mesopotamia, but nevertheless the 'Abeid are still powerful enough to render themselves obnoxious to the government. They at present occupy the country opposite Tekrit, and, I believe, now never cross into Mesopotamia.

At 3h. 15m. the tomb of Imám Mohammed Dúr, at Dúr, bore E. In shape it is a cone, similar to that of the tomb of Zobeideh in Baghdád, on a square base. The village is a collection of miserable houses on the undulating mounds which form the E. margin of the valley of the Tigris, and boasts of a small minaret. Mr. Rich appears to identify this spot with the plains of Dura mentioned in Scripture. The river opposite to the village is divided into numerous narrow channels, through which it flows at a very rapid pace. We came to an anchor about one mile above the village.

The inhabitants soon assembled. The Páshá's letter was presented, and received with every mark of respect. After a short consultation, a boisterous fellow was called for, with hands stained with indigo; he was a dyer by trade, as well as a Mulláh and teacher of the youth of Dúr. The letter was handed to him to read aloud, for the satisfaction of his auditors, who formed a circle round him. Thrusting his right hand into his pocket, which was

capacious enough to hold any one of his scholars, he produced a pair of spectacles, and, fixing himself in a commanding position, vociferated forth the contents of the missive at the full pitch of his stentorian voice. When he concluded, a buzz of applause signified the approbation of the assembly and their willingness to act in any way I might require.

To the E. of Dúr, about $1\frac{1}{2}$ mile, there is a high tumulus named Tel Benát, or the "daughter's mound." It is similar to the Tel Alij, and can be seen at some distance off, from its insulated position on the plain. Between it and the village there are many lime-kilns. Lime is here found in great quantities, and Baghdád is chiefly supplied from this place; it is conveyed on rafts down the Tigris. I remarked that the inhabitants here generally appear sickly, and sore eyes seem to afflict the greater part of the community. Some of the women were very pretty and fair, and evinced no alarm at coming near the vessel.

9th.—We continued our ascent. The river above this place is new to us, not having gone beyond Dúr when we attempted the ascent in 1843. Indeed, had we not been favoured with a strong wind, I fear our present attempt would have been attended with the like disappointment. At 10h. 50m. a small enclosure in the háwí, on the left bank, bore E. two miles; it is called Khán Jozám, and affords protection to the cultivators when threatened by plundering parties of the 'Abeïd or Shammár. The tomb in Dúr bore, at the above time, 157° ; the river from Dúr to this place is known by the name of the Khán, and is much intersected by islands, which render the main channel extremely sinuous. Our ascent so far has been one continued struggle against a rapid stream with falls every half-mile, which the vessel can scarcely overcome. Progressing steadily against these difficulties, we arrived opposite Sheri'at el Wojá, a landing-place formed by a gap in the cliffs on the W. side of the Tigris; from this Dúr bore 149° ; caravans here halt for water. At 7 P.M. we anchored at Tekrít, and received a visit from its Governor, Mustafá Efendí, who put the resources of the town at our disposal, and rendered us much service by placing at our command several Khavvases, without which we could scarcely hope to complete the supply of fuel for the vessel, the crowd around being so great.

In the evening I walked to the top of the cliff on which the old citadel stood; it bears evidence of former strength, and, being naturally almost inaccessible, must have been completely so when fortified. The front facing the river is quite perpendicular, and exhibits horizontal strata of stiff clay, red earth, fine sand, and conglomerate, in successive layers from the water's edge to its summit; this is the general formation of the cliffs bounding each

side of the valley of the Tigris, from Sámarráh to Tekrít. This insulated cliff is about 130 yards long by 70 broad, and in height 86 feet from the water's edge; but the fragments of the former buildings scattered over its summit increase it to 100 in its highest part. Large massive bastions of lime and pebbles, faced with solid brick-work, are still remaining round the cliff, between which the wall once stood. On the S. face, between the citadel and the modern town, and half-way down the cliff, two buttresses, of the same construction as the bastions, point out the situation of the gateway; the bricks which faced them have been carried away. A deep ditch, about 30 yards in breadth, but now filled up with rubbish, conveyed the water of the Tigris around the base of the citadel, thus completely insulating and rendering it impregnable, before artillery was known. S. of this, on another detached hill, stands the modern town, formerly girt round by a wall which has fallen to decay; it contains at present about 300 miserable houses and 1000 inhabitants, but the space formerly occupied by the ancient town is of great extent. Some ruins called Kanísah ('Church') are still shown. A few years ago, when Sufúk, the Shammár sheikh, invested the town, a trench was dug by the inhabitants for defence; in it many earthenware urns and sepulchral vases were found, one of which, in the possession of Mulláh Rejeb, spoken of by Dr. Ross in his Journal, I with difficulty procured from the owner. It is surmounted by figures of men and birds, of a curious but rude execution, and is probably Babylonian. The modern town has two mosques, but no minarets; the streets are kept free from filth, and altogether have an appearance of cleanliness and order seldom seen in Eastern towns.

I am told, on an emergency, 400 matchlocks and guns can be collected for the defence of the place, and am inclined to believe that this is rather under than above the true amount. It is certain that the Tekrítís have maintained their position against the Arabs, and even compelled the powerful sheikh of the Shammárs to relinquish his intended assault on the place, by the menacing attitude they assumed.

Mr. Rich, in speaking of this place in the flourishing times of Dávud Páshá, states that it was then farmed for 22,000 Constantinople piastres annually, and that it boasted at that time of 600 houses. I presume this must be a mistake; for at present, though its dwellings are but half that number, and its population proportionably small, from the effects of the plague and other causes, the proprietor or farmer pays yearly to the government of Baghdád a sum three times as large as that mentioned by Mr. Rich; 68,000 Constantinople piastres, or a sum equal to about 600*l.*, is the amount paid this year. Great complaints are made by

the Tekrítis against the government, and on account of the present unsettled state of this part of the country. Fear of the Shammárs on the one side, and the 'Abeid on the other, have prevented the townspeople from extending their cultivation to its usual limits, and the consequence is, the rich land lying between Tekrít and the Hamrín hills is now a perfect waste. The inhabitants are all Mohammedans, with the exception of one solitary Jew, who is on the staff of the governor, and whose life is not to be envied. To the question of "What have you in Tekrít?"—"One barren date-tree and an infidel Jew," was the reply.

During the night I obtained a mer. alt. of α Scorpii, from which I determined the latitude to be $34^{\circ} 35' 45''$ N.

Having got observations for regulating the chronometer, and despatched a messenger to Músul with letters to the Vice-Consul, and directions to communicate with Sufúk, to whom I addressed a complimentary epistle, we left Tekrít at 9h. 40m. A.M. A new pilot, or rather an old one (for I believe he is upwards of 70 years of age), was shipped as our guide above this place: in fact, he is the same individual who piloted the "Euphrates" under Lynch seven years ago. He declared, after having been on board an hour, and witnessed the performance of the vessel against the current, that she could not pass the rapids, which the "Euphrates" found a difficulty in ascending. Indeed, what he says will, I fear, prove true, for our progress to-day has been considerably slower than yesterday, and in many places amounted almost to a standstill. At 4h. 15m. P.M., having a long reach full of difficulties ahead, and no hope of passing them before night came on, we brought to an anchor in the only secure spot to be met with in this neighbourhood.

From Dúr the principal channels appear to be confined to the western part of the bed of the Tigris; but below that place the main body of the stream passes along the eastern cliffs. The lat. was determined this evening by a merid. alt. of Dúbhe $34^{\circ} 41' 52''$, thus making our whole day's progress, of $6\frac{1}{2}$ hours' steaming, equal to $6' 7''$ of nothing only.

11th.—At 6h. 14m. A.M. we weighed; but, in coasting, the stream caught our bow, and there not being room, from the narrowness of the channel, to bring the vessel's head up stream with the helm, we dropped an anchor in hope of checking her speed, but without effect, from the hardness of the bottom. We consequently drifted down a considerable distance before we could get her head round, and did not reach the place whence we started till 6h. 45m. The anchor, too, on heaving it up, was found to have lost its stock. The boats were sent with a party of men to track up while the vessel ascended the rapid, which she did with tolerable ease. We steamed up to a bluff point of the cliffs on

the W. side of the river, called 'Abdul Kerím, from the tomb of an old Imám, now in ruins, standing on its summit. Hauled alongside the bank to wait for the boats, which came through an inlet or khaléj (channel). Observing a party of Shammár horsemen making towards the boats, we sent an armed detachment to prevent their molesting the trackers, on which they retreated. The boats having joined us at 9h. 20m., we steamed on. The river rose 16 inches between sunset and daylight, causing a greater rapidity in the current. It is hereabouts divided into many channels by well-wooded islands. 12h. 20m. we reached Kubar (tombs) on the left bank, near a high mound in the plain, and the first tamarisk grove met with N. of Baghdád. The channel is very winding to Kāleh Abú Reyyásh.

At 4 P.M. the Kāleh bore W.; it is a ruined fort on the cliffs, with a fine plain, or háwí, extending eastwards from it. The edge of the river from Tekrít to Khán Kharnéinah is now entirely peopled by the Shammárs, and all communication between Tekrít and Músul is in consequence stopped. They have vast herds of camels and sheep, which are seen grazing with their beautiful horses on this rich plain, dotted here and there with black tents, affording a pleasing picture of pastoral life, did not the character of the tribe contrast sadly with its primitive habits.

At 5 P.M. brought to for the night near the Eastern bank. Our whole progress to-day, as deduced from the latitude determined by an altitude of Dúbhe to be $34^{\circ} 49' 43''$, has been but $7' 51''$ Northwards. The river rose 3 inches during the night.

12th.—We left our anchorage at 6 A.M., and struggled hard against the rapid stream till 9, when we were opposed by a fall. The ascent of this, not 100 feet in extent, occupied us till 11h. 20m. It was only overcome at last by the aid of a South wind, and by sending our boats to track up in-shore. 12h. 30m. passed a ruined Khán named Kharnéinah, situate under the cliffs on the W. side of the valley. These cliffs now diverge considerably more to the W., while those forming the Eastern boundary of the valley of the Tigris trend more to the E., leaving abrupt and broken angles at Kharnéinah on the W., and at a point called Legleg [Stork] on the E. About 3 miles immediately N. of Legleg, the remains of the Nahr Háff, or upper branch of Nahráwán is seen. It is said to have conveyed the waters of the Tigris under the cliffs through a tunnel, to the main branch at Kantarah el Resas; another small canal or feeder is situate about 2 miles S. of the same point. From the diverging points described above the country is more open, and undulates in gentle slopes to the foot of the Hamrín range. From Khán Kharnéinah the river is very winding, and is divided by numerous beautiful islands, covered with every species of wild plants, as well as tamarisks and

poplars, some of which have attained to a considerable size, and afford a precarious livelihood to the inhabitants of Tekrít, who carry the timber on rafts to Baghdád for sale.

After leaving Kharnéinah our progress was a little more rapid, owing to the fine southerly wind which continued till sunset, when we made fast for the night at an island about three miles below "el Fet-hah," or the "opening," where the Tigris breaks through the hills. The latitude here observed was $34^{\circ} 56' 57''$, and the northern mouth of the Nahrawán bore N.E. 1 mile distant. The continuation of the Hamrín hills on the W. side of the Tigris, termed Jebel Mak-húl, is now end on, and bears N.N.W. $\frac{1}{2}$ W. The eastern ridge, or that termed Jebel Hamín, extends from a little above this point S.-Eastwards, and is an incongruous heap of barren mounds, composed of sandstone and pebbles, without a blade of vegetation. Both the Hamrín and Jebel Mak-húl are of similar formation, and may be reckoned about 500 feet high at this spot, though their altitude decreases as they advance to the S.E. The rich plain at their base forms a pleasing contrast to their desolate summits. During the night the river fell 6 inches. Thermometer from 50° to 85° in the shade.

13th.—Left our station at 5h. 45m., and, not being favoured as yesterday with a S. wind, advanced at a snail's pace to our depôt of wood, which we reached at 7 A.M. It had been cut in a small tamarisk grove, just above the mouth of the Nahr Hafii, and covered in with branches, to prevent its being set on fire by the Arabs. Here we remained, writing and despatching answers to letters just received from Baghdád, till 9h. 30m., when we made a fresh start, but, as I had anticipated, with little or no success. Struggled hard against the stream, which here breaks through the hills with much force, till 11h. 20m., when we were brought to a stand-still, without any hopes of accomplishing our object; and, on considering that our success hitherto had been mainly attributable to fresh S.E. winds, while obstacles of a much more formidable nature than those hitherto encountered awaited us, besides the risk we ran of grounding and eventual detention, should the water fall after having risen to so great a height, I reluctantly determined to retrace my steps to Baghdád, and accordingly put the helm up.

The last day's journey has been through a rich country, covered with wild plants of almost every description; undulating slopes of an emerald green, enamelled with flowers of every hue, are spread before the eye like a rich carpet at every turn of the stream; and nothing is wanting but the hand of man to turn such a profusion of nature's bountiful gifts to account. But all is a vast solitude. The silence is unbroken except by the rushing of the torrent past the time-worn cliffs, or

by the screeching of an owl awakened from his slumbers by the flap, flap, flap of our paddle-wheels. When Mr. Rich passed this spot, some twenty years ago, all was bustle and activity, Arab tribes were encamped upon the banks of the river, and the beautiful islands, rich in their spring-garments, were the abode of peaceful husbandmen. The ruthless Shammárs have since that time, through the feebleness of the Turkish government, spread devastation wherever they pitched their tents; and, thinned by the plague which assailed the Pashálik in 1841, the former inhabitants have been obliged to flee to the more secure districts in the neighbourhood of Kerkúk.

The rapidity with which we are now descending, after our hard struggle upwards, appears to gain fresh impetus every mile. Rocks and islands, steep cliffs and shingly banks, quickly succeed each other; cattle, tents, and men are passed in a single hour, and the silent desolation of yesterday is exchanged for the noise and activity of a well-peopled country. The following table will show the rapidity with which we advanced:—

	P.M.
Khán Kharneínah . . .	Oh. 52m.
Anchorage of 11th April . .	1 15
Kaleh Abú Reyyásh . . .	1 30
Tekrit	3 20

thus descending in 3h. 50m. through a distance which had taken 30 hours in our passage upwards. Between 'Abd el Kerím and Kaleh Abú Reyyásh a small stream or torrent falls into the Tigris on the left side. It is named Nahr Milh (Salt river), and is said to be of considerable size in the winter months, when swollen by the torrents from the Hamrín range.

14th.—Reached Sámarráh at 9h. 9m. A.M., and remained there during the day to make arrangements for sending our overplus fuel to Baghdád by rafts. In the evening I visited the Malawíyah, and from its summit obtained several bearings.

15th.—Left Sámarráh at 6h. 21m., and steamed down the river against a heavy S. wind, which in the reaches directly opposite to it raised the waters of the Tigris into a considerable swell.

Anchored off the gardens of Turumbah in a heavy squall of thunder, lightning, hail, and rain, at 6h. 20m. The next morning we took up our old berth at Baghdád, after passing through the bridge of boats.

From these observations it will be seen that the journey northward against the stream occupied $86\frac{1}{2}$ hours steaming, while the descent was performed in the short space of 19 hours.

I much regret the termination of our trip; for I had flattered myself that it might not only prove useful in a geographical sense, but be also both instructive and amusing. I had contemplated,

could I have only reached the neighbourhood of Músul, a visit to that town and the adjacent ruins of the Assyrian cities of Nineveh, Khorsábád, and Nimrud, as well as a minute examination of the interesting Al Hadhr, so graphically described by my friend Dr. Ross; and I feel the disappointment the more, as I have already been six years in this country without ever having had such an opportunity, my duties not permitting me to absent myself from the vessel for a length of time such as would be required to perform the journey by land from Baghdád.

The failure of this attempt is not to be attributed to any severe obstacles met with in the navigation of the Upper Tigris; for to a vessel possessing the power of those now running on the Thames, of an average speed of 10 knots per hour, such difficulties as the Nitocris experienced would be deemed of minor importance. The Nitocris, indeed, under the most favourable circumstances in still water, cannot exceed the speed of 8 knots per hour, having a wheel of 12 feet diameter only, and a short stroke of 30 inches. It can hardly, therefore, be deemed a matter of surprise that she should have failed to contend against a stream of $6\frac{1}{2}$ geographical miles per hour, with occasional falls, when it is considered that she carried above one month's provisions and 18 tons of fuel, besides the guns, matériel, and men, on the present expedition.

When I left Baghdád I hoped for, but did not anticipate success. I am therefore not disappointed. We have at all events to congratulate ourselves on having ascended to the Hamrín, whereas our former journey, having the same objects in view, terminated at Dúr from an insufficiency of water.

The bearings throughout these notes are true, excepting where expressly mentioned by compass.

Bombay, 26th July, 1846.

II.—*On the best Means of reaching the Pole.*—By Admiral F. WRANGEL.

[Read April 12th, 1847.]

THE vast accumulation of ice—which covers the northern seas in immense fields, high hills, and small islands—subjects the navigator in these waters to incessant danger and anxiety: to struggle with the elements, to overcome obstacles, to be familiarized with dangers—all this is so habitual to the seaman, that he is sometimes even dull without it. The continual, uniform, and quiet navigation in the regions of the trade-winds excites in the sailor a desire for change: he encounters a squall with joy, welcomes even a storm in the seas beyond the tropics not without a certain

pleasure; and, confident in his skill, in the activity and indefatigable energy and experience of his crew, in the strength of his vessel and soundness of all her parts, he does not fear the terrible powers which so often put to the trial all his patience and all his coolness. Such being the ordinary feeling of the seamen, it is not astonishing that the Frozen Ocean has long attracted the navigators of all nations, but in particular those of England—that country which has an indisputable right to be regarded as the first of all maritime nations. Without taking into consideration the great number of whalers, who have carried on their trade among the mountains of ice in the most remote latitudes of the Atlantic, England has sent out fifty-eight distinct expeditions to discover a shorter passage to the Pacific, either by the N.W. or N.E. channel, from the time of John Cabot (1497) to George Back (1836): not one of these has been crowned with complete success.

In all those enterprises, however, one common aim, not specified in the instructions, has ever been kept in view; and this aim has been more or less attained by every successive attempt—the maintenance of the spirit of enterprise and the support of a laudable national pride, in the attainment of the laurels of disinterested exploits, for the advantage of science, trade, and navigation—the true sources of power and glory to every maritime people.

When, after nearly three centuries and a half, scientific men, and even navigators, were persuaded of the improbability of the existence of a N.W. or N.E. passage to the Pacific, practicable for trade, the evident aim for new enterprises was transferred to the invisible point of the earth—the North Pole. The expedition of Captain Buchan, and the fourth voyage of the indefatigable Parry, were undertaken expressly with that view.

This question, supported by the celebrated Barrow, has been again moved in England, and has resulted in the exchange of opinions on this subject between navigators and scientific men.

Captain Sir William Edward Parry, in a letter, dated the 25th of November, 1845, to Sir John Barrow, proposes in a short outline a new plan for the expedition. Following the principles there traced, a party would not, he thinks, meet with any of the difficulties encountered by Parry himself in the latitude of $82^{\circ} 45' N.$, or about 2° to the N. of the extreme point of Spitzbergen, which was the starting-point of the Polar Expedition. Having unequivocally assigned as the chief causes of failure in those attempts—to which, however, no others can be compared with respect to the difficulties overcome—1st, the broken, uneven, and spongy state of the ice, covered with snow; and, 2ndly, the drift of the whole mass of ice in a southerly direction—Captain Parry proposes, in order to avoid these unfavourable circumstances, that the ship employed in the projected expedition should winter

at the northern point of Spitzbergen, and the party particularly designed for the attainment of the Pole should leave the vessel in April. About 100 miles north of this point there should be previously prepared a store of provisions, so that the party, at the commencement of its journey, should not be too heavily laden; and about the time of its return, according to the reckoning of Parry, in the course of May, there should be sent out another detachment with provisions to meet it about 100 miles further from the place where the ship is wintered. Captain Parry founds his hopes of success on the supposition that, in April and May, the party would proceed about thirty miles a-day along the ice, which would then offer an immovable, solid, and unbroken surface. He also thinks it advisable to provide the expedition with reindeer.

Finding it difficult to make these ideas of Captain Parry accord with those which I entertain respecting the state of the ice and the circumstances indispensable to success in travelling along its surface, I beg leave to express my doubts, and submit my ideas on this subject.

Expeditions were undertaken in the years 1821, 1822, and 1823, in the Siberian Frozen Sea, from two points of departure, distant one from the other, in the direction of the parallel, more than 1000 miles, viz. from the mouths of the rivers Lena and Kolyma. These expeditions occupied an interval from about the end of February to the beginning of May (O. S.), and the state of the ice does not at all seem to have been such as Captain Parry supposes it to be, to the north of Spitzbergen, in the course of April and May (N. S.).

Lieutenant (now Rear-Admiral) Anjou was stopped by thin and broken ice moving in different directions, in

1821. April 5 (O.S.) at the distance of 20 Italian miles from the nearest shore	} N. of the island Kotelnoy.
1822. March 22. 22 Italian miles . . .	
„ April 14. 60 „ . . .	E. of New Siberia.
1823. Feb. 28. 59 „ . . .	} N. of the islands at the mouths of the Lena.

The expedition commanded by the author, which took its departure from the mouth of the Kolyma, encountered the same impediments:—

In 1821. April 3, at 120 Italian miles . . .	} N. of the nearest shore.
„ 1822. „ 12, at 160 „ . . .	
„ 1823. March 23, at 90 „ . . .	

But on the 27th of March the masses of ice, which were separated from each other by large channels of open water, were driven about by the wind and threatened the voyagers with destruction.

My hypothesis is founded on the above facts, collected during a three years' navigation in a sea whose depth is not more than 22 fathoms, and which is, so to say, landlocked to the S. by the Siberian coast, and there defended from the winds and waves over a space of 180° of the compass; whereas the sea on the meridian of Spitzbergen has a considerable depth, and is exposed to the swell of the whole Atlantic. Therefore I cannot concur in Captain Parry's hopes that the ice can be in a state favourable to the execution of a journey towards the N. in April and May.

Captain Parry's calculations as to the possibility of advancing thirty miles a-day seem to imply the employment of reindeer, and would render it necessary to provide the expedition with those animals: we must, therefore, conclude that that officer expects to obtain the necessary rapidity by the assistance of rein-deer. If I am warranted in this supposition, I must remark that rein-deer are far from being capable of advancing over the uneven surface of the ice, and are besides too weak to carry heavy burdens.

Sir John Barrow, in his work '*Voyages of Discovery and Research within the Arctic Regions*,' &c., publishes the above-mentioned letter of Captain Parry, disapproving, however, his proposed plan, and anticipates greater success in the enterprise by accomplishing it in small sailing-vessels, fitted with the Archimedian screw (like the ships '*Erebus*' and '*Terror*'), and steering northward on the meridian of Spitzbergen: in other words—Barrow proposes the repetition of the former attempts, notwithstanding their failure, expecting success from more favourable circumstances. But here a question is naturally suggested—may there not exist means of reaching the Pole other than those which have been hitherto resorted to—means not liable to the various inconveniences already encountered during the several expeditions undertaken from the coasts of Siberia towards the N. upon the surface of the ice, and which must be encountered in proceeding on foot, as Captain Parry proposes?

The last Siberian expeditions were executed in a particular kind of sledges, called "*Narty*," drawn by dogs. The expedition, undertaken from the mouth of the Kolyma, travelled in this manner in 1823 (from the 26th February to the 10th May) 1533 miles, of which the greater part was along the shore towards the island of Kolutchin, seen by Captain Cook during his navigation in a N.W. direction from Behring's Straits. We proceeded upon the ice along the shore very successfully, but as soon as we left it the difficulties and impediments increased. If the coast of Siberia had a direction parallel to the meridian, the Kolyma expedition would have travelled 11° of latitude in one direction and the same in returning; therefore, if the point of departure had been the 79° of N. latitude, the expedition might have reached the Pole and returned to its starting-point.

The utmost limits of the coast of Greenland towards the N. remain yet unknown; but the meridian direction of its mountains and coasts allows us to suppose that, in proceeding along them, it is possible to approach the Pole nearer than from any other direction, or even to reach that point.

The northernmost point of Greenland, Smith's Sound, seen by Captain Ross, is in latitude $77^{\circ} 55' N.$; and in latitude $76^{\circ} 29'$, and on the island Wolstenholme, there is a village of Esquimaux. Taking all this into consideration, my opinion may be expressed in the following plan:—The ship of the expedition should winter near the Esquimaux village, under the 77th parallel, on the western coast of Greenland. There should be previously despatched to this point, in a separate party, at least ten narty, with dogs, and active and courageous drivers; the latter the same, if possible, as were employed in the Siberian expeditions,* likewise stores and provisions in sufficient quantity. In autumn, as soon as the water freezes, the expedition should go to Smith's Sound, and from thence further towards the N. On arriving at 79° , it should seek on the coasts of Greenland, or in the valleys between the mountains, for a convenient place to deposit a part of the provisions.

In February the expedition might advance towards that place; and in the beginning of March another station, two degrees further N., might be established. From this last point the Polar detachment of the expedition would proceed during March over the ice, without leaving the coasts, keeping along the valleys, or on the ridge of mountains, as may be found most expedient, but deviating as little as possible from the line of the meridian, and shortening the distance by crossing the straits and bays. A part of the men, dogs, and provisions, should await their return at the last station.

The expedition, to reach the Pole and to return, must traverse in a direct line nearly 1200 miles, or, including all deviations, perhaps not above 1530 miles, which is very practicable, with well-constructed sledges, good dogs, and proper conductors.

If the most northern limits of Greenland, or the Archipelago of Greenland Islands, should be found at too great a distance from the Pole, and the attainment of that point seem impossible, the expedition might at any rate draw up the description of a country hitherto absolutely unexplored, and would, even by so doing, render an important service to geography in general.

* The success of such an enterprise would chiefly depend on the kind of dogs, the experience and courage of the conductors, and the form of the sledges. It certainly will not advance rapidly if Esquimaux or Tchouktschi dogs are employed, because these are entirely unaccustomed to such long journeys; nor with Esquimaux or Tchouktschi drivers,—men without courage or activity.

III.—*Note on the Paper of Admiral the Baron von Wrangel on the best Means of reaching the North Pole.* By Sir JOHN BARROW, Bart.

WHATEVER proceeds from Admiral von Wrangel, who is a practical officer, is entitled to attention; few men have had more experience of danger on an icy sea than he has had, but in a different quarter of the world, and under different circumstances, to those who have prosecuted northern discoveries in the Arctic Regions. As a geographical problem of great interest, a visit to the North Pole would afford a most desirable solution; and, in these days of adventurous discovery, I should not despair of its accomplishment, though I shall not live to see it.

I entirely agree with the Baron as to the doubts he entertains of Captain Sir Edward Parry's plan of proceeding over "an immoveable, solid, and unbroken surface of ice." I believe that no such thing is to be depended on; the state of the ice, from what I have seen in the Spitzbergen Sea as high up as 80° N., is constantly changeable, and dependent on the direction and force of the wind; and the only chance, in my opinion, of reaching the Pole by the navigation of that sea would be by taking advantage of the immense pools of open water which every strong wind gives rise to: but as to the *screw*, I should not recommend the adoption of it in the ice until we know the result of the experiment now trying in the Terror and Erebus. If the land of Greenland ceases to the N. at or about the 80^{th} degree, it is by no means improbable that an expansive basin of open water may surround the Pole; and, if so, circumstances would lead us to the conclusion that, in the absence of land, there would also be an absence of ice.

The success which the Baron and others have met with in the Siberian Sea, between the mouths of the Lena and the Kolyma, a thousand miles or more, by proceeding in sledges on firm ice along the shore, which extends the whole distance in an easterly and westerly direction, affords no means of advance towards the Pole, which causes Von Wrangel to express something like a regret that the coast of Siberia had not been made to extend N. and S., which in that case would have reached the Pole; but it should be considered that with a change in the direction of the line of coast would also occur a change of circumstances. As far as my knowledge extends, the N. and S. winds in the Arctic Regions are the most powerful, and disturb the ice much more than those which blow from the E. and W.; and I should rather conclude that if the Baron had succeeded in changing the direction of the Siberian coast to N. and S., the state of the ice, instead of being firm and fixed as he found it, would have become,

in its new position, like that on the E. coast of Greenland, a line of heavy and rugged masses, which neither sledges, nor dogs, nor reindeer could travel over.

When Captain Clavering took Lieut.-Col. Sabine along this coast for the purpose of swinging a pendulum, he proceeded in a sailing vessel as high up the coast as the latitude $75^{\circ} 12'$, and saw a high point, which he named Cape Philip Broke, in latitude 76° ; beyond which we know nothing. That it runs up much higher we know from the opposite coast in Baffin's Bay, the head of which extends to between 77° and 78° N.

So that on either coast of Greenland our knowledge is very limited, but extends so far, as the Baron observes, "to allow us to suppose that, in proceeding along them, it is possible to approach the Pole nearer than from any other direction, or even to reach that point."

With regard to the plan of Von Wrangel, I cannot venture to give any opinion, being in utter ignorance of the nature of sledges, dogs, and drivers; I only know that they are capable of doing wonderful things. He says, that in autumn the expedition should go to Smith's Sound, and from thence further towards the N.; on arriving at the 79^{th} degree it should seek, on the coasts of Greenland or in the valleys between the mountains, for a convenient place to deposit a part of the provisions. As to going to 79° , and further in Smith's Sound, the Baron seems not to be aware that nothing whatever is known of Smith's Sound beyond the opening, which is supposed to be its mouth. That the expedition should keep along the coasts or in the valleys, and, as much as possible, not deviate from the line of the meridian, is no doubt most advisable; and we are assured that, "to reach the Pole, and to return to the stations, the expedition must traverse in a direct line nearly 1200 miles, and including the deviations not above 1530 miles, which is very practicable with well-constructed sledges, good dogs, and proper conductors."

I cordially agree with the Baron's concluding paragraph:—

"If the most northern limits of Greenland, or the archipelago of Greenland islands, should be found at too great a distance from the Pole, and the attainment of that point seem impossible, the expedition would at any rate draw up the description of a country hitherto absolutely unexplored, and would even by so doing render an important service to geography in general."

After all, where an icy sea is to be encountered, give me a couple of strong, roomy, well-built sailing vessels, well stored with provisions, so that all concerned, during the most inclement weather, may have substantial houses over their heads.

IV.—*Journal of an Expedition undertaken by the Messrs. Gregory, in the months of August and September, 1846.* The party consisting of A. C., F. T., and H. C. GREGORY, four horses, and seven weeks' provisions.

[Read December 13th, 1847.]

August 7th, 1846.—LEAVING Mr. Yule's farm at Boyeen Spring, we passed Capt. Scully's, at Bolgart Spring, at 10 h. 15 m. A.M. From this place, steering a course N. 70° E. (mag.), over sandy downs thinly timbered, at 50 m. P.M. crossed a small stream trending in the direction of our course, till 2 h. 0 m., when it turned to the S. At 3 h. 50 m. halted for the night on the bank of a small stream trending to the S.W.: lat. by observation 31° 12' 10" S., long. by account 116° 50' E.

8th.—At 7 h. 5 m. A.M. resumed a course N. 70° E. At 8 h. 15 m. crossed a grassy granite ridge of hills, after which the country was scrubby till 9 h. 30 m., when we entered a grassy flat timbered with casuarina. At 10 h. 25 m. the country became open and scrubby; at 45 m. P.M. observed a small lake, bearing N. 10° E.; steering for the lake, at 2 h. 10 m. arrived at the western side and halted till 3 h. 15 m., when we resumed our former course, N. 70° E., through a swampy country. At 4 h. 50 m. halted on the eastern side of a shallow fresh-water lake, about 1½ mile in length and 1 mile in width.

9th.—At 7 h. 35 m. A.M. steering N. 95° E., through a scrubby country, with wooded valleys; at noon observed several shallow lakes to the N.E., about 5 to 10 miles distant; at 3 h. P.M. turned to the N.E., and at 3 h. 30 m. N.; at 4 h. arrived at an immense samphire swamp, or rather plain, studded with many shallow salt-lakes; on the edge of this plain we found some good grass, and a native well of good and apparently permanent water, where we bivouacked: lat. by observation 31° 2' 22", long. by account 117° 23' 15".

10th.—Having marked a tree (Lat. 31° 2', G.), we left our bivouac at 7 h. 35 m. A.M., and, steering N. 95° E., passed several large salt lagoons, in a thick swampy country; at 9 h. 15 m. entered a gum-forest with close underwood, which rendered travelling very slow and difficult. At 11 h. 20 m. the country became more open, but with thick scrub. At 1 h. 0 m. P.M. observed several lakes to the N.N.E. and N.E., about 6 or 7 miles distant; we then entered a succession of dense thickets and patches of gum-forest, till 4 h. 25 m., when we turned N., and at 5 h. 30 m. halted in an open grassy patch surrounded by swampy thickets: lat. by observation 30° 58' 47", long. by account 117° 45' 10".

11th.—Started at 7 h. 25 m. A.M., steering N.E., through a

gum-forest; at 8 h. 30 m. changed the course to N. 95° E.; at 10 h. 15 m. the country became more open; at 11 h. 35 m., on ascending an elevated ridge, we saw several bare granite hills to the eastward; steering for the nearest, which bore N. 75° E., we arrived at the summit at 1 h. 40 m., and halted for the remainder of the day, there being an abundance of grass and water.

12th.—Leaving our bivouac at 7 h. 30 m. A.M., steered N. 122° E., through alternate patches of gum-forest and underwood with grass. At 11 h. 50 m. we arrived at the summit of a bare granite hill; from this spot we could see Lake Brown, bearing from N. 93° E. to N. 103° E.; Eaglestone Hill, N. 100° E., and several other remarkable peaks and hills. Leaving this hill at 0 h. 15 m. P.M. we steered N. 58° E. over an undulating wooded country, with several small watercourses trending to the southward; and at 4 h. 30 m. bivouacked on a scrubby hill, with a small pool of water on a granite rock. Lat. by observation 30° 59' 54", long. by account 118° 17' 0".

13th.—At 7 h. 30 m. A.M. resumed our course, N. 58° E., through a level gum-forest till 9 h. 40 m., then through spear-wood till 10 h. 15 m., when we entered an immense thicket with a few patches of gum-forest; this continued till 1 h. 25 m. P.M., when we came to a native well among some flat granite rocks; after this a level gum-forest continued till 3 h. 30 m., when it became scrubby, with dense thickets and patches of gum-forest. At 4 h. 40 m. we halted at the foot of a granite hill, with plenty of water and grass among the rocks.

14th.—Starting at 10 h. 35 m. A.M., and steering N. 41° E. through a level country, with thickets of acacia, cypress, and eucalypti, with some grassy patches, at 2 h. 20 m. P.M. made a bare granite hill, with large shallow pools of water on the top. We bivouacked at the foot of the rocks, in an open grassy patch.

15th.—Leaving our bivouac at 7 h. 15 m. A.M., and steering N. 50° E., at 8 h. 50 m. crossed a steep rocky ridge of white sandy rock resting on granite; after this the country was grassy, with little timber, till 10 h. 30 m., when we entered a thick scrub; at 11 h. 0 m. observed a high granite hill bearing N. 53° E. At 2 h. 50 m., ascending a small tree, observed a very remarkable range of rugged hills about 40 miles distant, the highest summit of which bore N. 57° E.; at 3 h. 30 m. the thicket changed to scrub, with a few trees. At 4 h. 15 m. came on a small water hole in a granite rock, and halted for the night. Lat. by observation 30° 31' 43", long. by account 118° 52' 20".

16th.—At 7 h. 15 m. A.M. resumed our march on a course N. 68° E. through a well-wooded grassy country till 9 h. 35 m., when we ascended a rich grassy hill composed of fragments of trap rock. From this hill several others were seen of a similar charac-

ter to the southward; to the northward numerous large dry lakes occupied the valley, along the southern declivity of which we had been travelling since we left Lake Brown. At noon, struck the southern shore of one of the lakes; the banks were composed of gypsum and red sand; in some parts they exceeded 30 feet in height; following the shore of the lake to the S., and then E. till 1 h. 15 m., we again resumed our course N. 56° E. through dense thickets of acacia, with patches of forest consisting of gum and cypress trees, the soil a red sandy loam, nearly destitute of small vegetation.

17th.—At 6 h. 30 m. re-commenced our journey, steering N. 50° E. till 6 h. 55 m., when we passed a narrow samphire flat trending E. and W.; changing our course to N. 63° E., at 7 h. 35 m. crossed a deep watercourse trending to the S.W. At 8 h. 15 m. ascended a trap hill with a few granite rocks at the foot, among which we found a few small pools of rain-water; here we remained for three hours to refresh our horses, and then proceeded N. 40° E. till 2 h. 20 m., when we arrived at the foot of the highest hill on the range, for which we had been steering the previous day; leaving our horses we ascended the hill, which was composed of trap rock, striped red and black, and did not exceed 300 feet in height above the general level of the country; from the summit several similar ranges of trap hills were visible, extending from N. to E.S.E. To the S.E. the country appeared to be a level sandy desert, without the least appearance of vegetation; numerous native fires were visible to the W. and N. The extremely level character of the country between the ranges of hills to the E. and N., and the immense columns of red sand or dust which the numerous whirlwinds raised to the height of 200 to 500 feet, gave but small hopes of obtaining water in that direction. Returning to our horses at 4 h. 20 m. we steered for a small patch of grass, which had been seen from the hill, bearing N. 350° E., about 3½ miles distant; here we found a small watercourse trending to the W., with rich soil on its banks, but the grass was evidently suffering from extreme drought. Lat. by observation 30° 12' 28", long. by account 119° 16' 10".

18th.—After 6 h. ineffectual search for water we were compelled to return to the watering-place of the preceding day.

19th.—At 7 h. 20 m. left the bivouac, and proceeding N. 275° E. through a scattered gum-forest, with much underwood, at 9 h. 55 m. came on a dry salt lagoon, crossing which at 10 h. 12 m. passed a native well among large, flat, granite rocks; ascending gradually at 11 h. 50 m. we arrived at the top of the hill, which was crowned with steep white cliffs 20 to 30 feet high; the course was then changed to N. through a dense thicket till 12 h. 20 m., when we resumed our former direction through a well-wooded

country. At 3 h. halted on a high granite hill, with some patches of grass, and abundance of water in the hollows of the rocks. Lat. by observation $30^{\circ} 19' 33''$, long. by account $118^{\circ} 54' 45''$.

20th.—At 7 h. 30 m. A.M. resumed a westerly course through a succession of dense and almost impassable thickets of acacia and melaleuca.

21st.—At 7 h. 45 m. A.M. left our bivouac, steering N. 320° E. over an undulating country, covered with thicket and patches of gum and cypress forest.

22nd.—Started at 7 h. 35 m. A.M., steering N. 275° E. through a succession of thickets, gum-forest, and patches of scrub. At 12 h. 30 m. observed a granite hill bearing N. 315° E., and, turning in that direction, at 2 h. 15 m. made the hill, and, finding some excellent grass around a native well, halted for the remainder of the day to refresh our horses. Lat. by observation $30^{\circ} 3' 36''$, long. by account $118^{\circ} 7' 45''$.

23rd.—At 7 h. 40 m. A.M. started in a direction N. 320° E. over a thinly timbered and at first scrubby, but changing gradually to a grassy country. At 10 h. 5 m. altered the course to N. 336° E. At 1 h. 5 m. P.M. gained the summit of a high granite hill; from this a succession of dry lakes trending to the N.E. were visible, and a very remarkable hill, N. 312° E., distant about 35 or 40 miles; turning towards this hill, through an almost continuous thicket, at 4 h. 20 m. halted at the foot of a high sandstone cliff, with some deep holes which still retained a small quantity of water.

24th.—Left our bivouac at 7 h. 35 m. A.M., and steering N. 312° E. passed over nearly a level country, timbered with cypress and gum, with dense thickets of brushwood. At 2 h. 40 m. P.M. bivouacked at a deep water-hole in a flat granite rock: lat. by observation $29^{\circ} 42' 31''$, long. by account $117^{\circ} 41' 30''$.

25th.—At 7 h. 20 m. A.M. resumed our journey, keeping in the same direction as on the previous day. At 9 h. 15 m. came on an extensive samphire flat extending as far as the eye could reach to the N.E. and S.W. We determined to attempt crossing it, as it did not appear to be more than 3 miles wide where we struck it; after traversing the samphire flat for an hour, we arrived at the dry bed of the lake which occupied the N.W. side of the valley; the ground at first appeared very firm, but having proceeded about half a mile, the hard crust of gypsum and salt which formed the surface gave way, and three of the horses were bogged almost at the same moment. The horses being quite exhausted by ineffectual struggles to extricate themselves, we proceeded to the opposite shore of the lake (about half a mile distant) and constructed a pair of hurdles of small trees, with the assistance of the tether ropes and canvas saddle-bags; placing these alternately in front of the horses, after six hours' continued exertion we had the satis-

faction of finding ourselves once more on *terra firma*, and observing a bare granite hill bearing N. 81° E., about 3 miles distant, steered for it, and at 6 h. 30 m. P.M. bivouacked at the foot, where we found some grass and pools of water on the top of the rocks. Lat. by account $29^{\circ} 37' 30''$, long. by account $117^{\circ} 38' 10''$.

26th.—From the summit of this hill we had an extensive view, the lake extending about 10 miles to the E., 12 to the S., 15 to the W., and 8 to the N., but to the N.E. by E. the lake formed the visible horizon; shallow pools of water a mile and upwards in extent, and low wooded and high rocky islands, were scattered over this vast expanse of salt, gypsum, and white mud. At 8 h. 35 m. A.M. started in a direction nearly S. along the shore of the lake, in hopes of turning the lake to the W. At 10 h. 40 m. turned N. 221° E., and at 12 h. 30 m. halted on a grassy granite hill, with a deep water-hole in the rock, about 1 mile from the lake. Lat. by observation $29^{\circ} 47' 13''$, long. by account $117^{\circ} 35' 45''$.

27th.—At 7 h. 40 m. steering a general course of N. 200° E., at 8 h. 40 m. again made the shore of the lake, and, following it, at 9 h. 20 m. it turned S.E., and at 9 h. 45 m. to a general course of N. 80° E., until 15 m. P.M., when we halted for an hour and a half under a very remarkable solitary white gum-tree. We then turned N. 173° E. till 2 h. 20 m., when the course was changed to N. 204° E. till 3 h. 30 m., when we left the lake (which trended to the west), and steering N. 250° E., at 5 h. 5 m. bivouacked at a native well in a small grassy valley. Lat. by observation $29^{\circ} 59' 4''$, long. by account $117^{\circ} 39' 0''$.

28th.—Starting at 7 h. 35 m. in a W.N.W. direction, at 8 h. 45 m. passed some small dry lagoons. At 9 h. 20 m. ascended a granite hill. From this we discovered that we were on a peninsula formed by two branches of the lake, and that farther progress in this direction was impossible; the lake continued to trend S. and formed the horizon in that direction. At 9 h. 40 m. we turned to the eastward; and at 11 h. 35 m. struck the southern extremity of the eastern branch of the lakes. Following the shore nearly E., at 12 h. it turned N.E.; at 20 m. P.M. N. 17° E.; and continuing this course at 1 h. left the lake. Crossing extensive open downs, at 2 h. 5 m. passed a dry lake on the right, and entered thickets of brushwood; at 2 h. 30 m. changed to a gum and cypress forest till 3 h. 0 m., when we came to a grassy hill, with rich soil, and quartz and granite rocks. After this we again entered the thickets. At 3 h. 45 m. the country became open and grassy; and at 4 h. 0 m. we attained the summit of a granite hill, from which there was an extensive view. On the N. side of this hill we found a native well in a fine grassy patch, and bivouacked. Lat. by account, $29^{\circ} 45' 15''$; long. by account, $117^{\circ} 45' 40''$.

29th.—At 7 h. 45 m. A.M. left the bivouac, and steered N. 30° E.

through dense thickets; at 8 h. 30 m. crossed our track of the morning of the 24th; at 9 h. 15 m. crossed a dry salt lake trending to the N.W. and S.E.; at 25 m. P.M. changed the course to N.; at 1 h. to N. 37° E.; at 1 h. 35 m. ascended a granite hill, on which we found a few small pools of water.

30th.—At 7 h. 35 m. A.M. resumed our journey N. over a level country with brushwood and grass; at 10 h. 35 m. ascended a steep grassy ridge, and found ourselves at the N.E. extremity of the immense lake which for five days had baffled all our attempts to proceed N. and W. The lake at this part was about 6 miles wide, and to the S.E. extended to the horizon; on the N. and W. there were many bare granite hills. At 11 h. 0 m., descending the ridge, we crossed a level flat covered with brushwood, and steering N. 328° E., at 12 h. 15 m. it became grassy, and ascending a grassy granite hill, halted at 12 h. 55 m. for the remainder of the day to refresh the horses. Lat. by observation, 29° 17' 56"; long. by account, 117° 46' 40".

31st.—Leaving our bivouac, at 7 h. 30 m. A.M. steered N. 328° E. for two hours, through thickets of cypress, gum, and acacia. The country then improved, became more open and grassy, with jam-wattle. At 10 h. 55 m. ascended a granite hill, and changed the course to N. 357° E.; at 11 h. 30 m. attained the summit of a high bare granite hill. From this we observed many similar hills to the N. and E.; a remarkable range of trap hills to the N.N.E., and about 30 miles distant; while from N. 281° E. to N. 302° E. were many trap ranges from 12 to 30 miles distant. Descending the hill at noon, we directed our course to the nearest range, which bore N. 302° E., traversing a level plain covered with brushwood, with some grass. At 4 h. 45 m. crossed a dry stream bed, trending to the W.; and at 5 h. 5 m. bivouacked on a granite hill, with some grass, and a fine pool of water in the rock. Lat. by observation, 29° 3' 14"; long. by account, 117° 30' 40".

1st September.—At 7 h. 45 m. A.M. resumed our journey, and at 8 h. 45 m. arrived at the hill we had been steering for on the previous evening. The summit commanded an extensive view: to the W. were many dry salt lakes and ranges of trap hills; on the N. the country was level for several miles, and then rose into a low range of granite hills, covered with brushwood and grass. Having taken bearings to the principal summits, at 9 h. 20 m. descended the hills, and steered N. 230° E. for some miles. The country was covered with dense thickets of acacia; at noon it was more open and grassy, with granite rocks; at 1 h. 5 m. passed several irregular dry salt lagoons; at 3 h. 30 m. halted at the foot of a granite hill with good grass, and water oozing out of a cleft in the rock. Lat. by observation, 28° 50' 44"; long. by account, 117° 20' 10".

2nd.—Leaving our bivouac at 7 h. 40 m. A.M., steered N. 330° E.

over a succession of granite hills, with acacia and grass. Several small watercourses trending westward occupied the valleys. At 12 h. 40 m. came on a party of four natives, who immediately decamped, leaving their spears, shields, &c. behind in their haste to escape. Observing a high and somewhat remarkable summit bearing N. 312° E. about 20 miles distant, we steered for it; the country still continued grassy and covered with brushwood, but was more level. At 3 h. 5 m. turned N. to a steep granite hill; at 3 h. 30 m. crossed a dry stream bed, 30 yards wide and 15 feet deep, trending to the N.W.; at 4 h. 10 m. halted in a gully in the granite hill, and obtained water by digging among the rocks. Lat. by observation, $28^{\circ} 34' 9''$; long. by account, $117^{\circ} 2' 10''$.

3rd.—Started at 8 h. 0 m., steering towards the hill seen the previous day, and which now bore N. 307° E. The country was nearly a dead level, with a few small dry stream-beds trending to the S.W.; the soil a red loam, producing brushwood and grass. At 10 h. 50 m. came on an extensive salt marsh or dry lake, which extended to the foot of the hill we were steering towards. At 12 h. 25 m. gained the summit. From this spot the salt marsh appeared to extend about 15 miles to the N.E., and a branch to the N.W. In that direction the water appeared to trend in wet seasons, but the dip of the country was so slight as to render it uncertain; to the N. a range of trap hills 5 to 10 miles distant intercepted the view; to the E. the granite hills continued to trend in a northerly direction. Having completed our observations at 2 h. 10 m., started in a direction N. 300° E. along the N.E. foot of a rugged range of trap hills; at 3 h. 50 m. passed a dry lake on the right; and at 5 h. 15 m. bivouacked in a patch of fine oat grass on the side of a trap hill. From the summit of the hill near the bivouac we could see the salt marshes continuing in a N.W. direction. All the hills within 20 miles appeared to be of the trap formation, and therefore gave no prospect of finding any water. Lat. by account, $28^{\circ} 24' 20''$; long. by account, $116^{\circ} 42' 20''$.

4th.—This morning we held a council, when it was determined that, as the horses had been 24 hours without water, and no prospect of obtaining a supply to N. or W. (there having been no rain for more than a month), it would be advisable to return to the well at our last bivouac to refresh; and then, by a westerly course, attempt to make the sources of the Hutt or Arrow-smith river. We accordingly started at 8 h. 10 m., and, after a smart ride of 6 hours, arrived at our bivouac of the 2nd.

5th.—Left at 7 h. 20 m. A.M., steering N. 240° E.; at 8 h. 15 m. crossed the large dry stream-bed, which here trends W. At 11 h. 0 m. ascended the ridge of trap hills which bounded the valley on the W. At 12 h. 0 m. found a small pool of water in a

gully trending to the W. After this we traversed an acacia thicket, with narrow strips of cypress forest, till 5 h. 50 m., when we bivouacked.

6th.—At 6 h. 45 m. A.M. ascended a granite hill, near the top of which we found a native well, where we halted at 7 h. 30 m. At 9 h. 0 m. resumed our journey over granite hills covered with brushwood and cypress, with some patches of good grass. At 11 h. 10 m. passed a native well; then steering W.N.W., we crossed three small water-courses, trending to the N.W.; and at 1 h. 15 m. halted in a patch of good grass at the foot of a bare granite hill, on the top of which we found a fine pool of water. Lat. by observation $28^{\circ} 50' 51''$; long. by account $116^{\circ} 29' 0''$.

7th.—Started at 7 h. 15 m.; steered N. 255° E., through thickets of acacia; at 10 h. 5 m. crossed a narrow strip of salt marsh, which spread into a dry lake to the S. After leaving the lake the country became more grassy, until 11 h. 30 m., when we entered a dense thicket of acacia, cypress, and eucalyptus. The country rose gradually till 4 h. 0 m., and then descended till 5 h. 25 m., when we crossed a small watercourse trending S.

8th.—Leaving our bivouac at 7 h. 0 m. A.M., we steered N. 275° E. At 7 h. 20 m. crossed a rich grassy granite hill; we then turned W.N.W. to a similar hill, where we halted half an hour to look for water; our search being unsuccessful, at 9 h. 30 m. we resumed a westerly course through alternate thickets and grassy gum forests till noon, when the soil changed from red loam to ironstone gravel; the grass disappeared and was replaced by scrub; the country was much broken, and continued to rise till 4 h. 0 m.; it then rapidly descended till 4 h. 30 m., when we struck a small watercourse trending S. Following the stream downwards for half a mile, we found a pool of water and an open patch of grass, and halted for the night, having travelled nearly 50 miles without obtaining water. Lat. by account $28^{\circ} 58' 50''$; long. by account $115^{\circ} 45' 10''$.

9th.—At 7 h. 30 m. resumed a westerly course through a grassy gum forest; at 8 h. 0 m. crossed a large watercourse, trending S., with many shallow pools; at 9 h. 10 m. passed a granite hill, and entered a rich grassy valley timbered with gum and jam-wattle, with a small watercourse trending N.: the ridge on the W. of the valley was destitute of timber, but covered with thickets of acacia and scrub. At 10 h. 0 m. turned N. 305° E., and at 10 h. 35 m. came on the head of a small stream-bed with water in pools; following it to the W.N.W., at 11 h. 30 m. it was joined by a running stream of brackish water, 4 yards wide, from the N.E.; the stream turned S.W. We then left it, and steered W. over an open scrubby country; at 12 h. 30 m. entered a dense thicket of eucalypti and acaciæ, the soil composed of fragments of granite

and trap-rock; at 1 h. 0 m. entered a deep valley by an abrupt descent, and found ourselves again on the bank of the stream, which was now much enlarged, and running through a narrow grassy flat, backed by sandstone cliffs 80 to 100 feet in height. Followed the river W. till 1 h. 55 m., when it turned N.; at 2 h. 30 m. it turned N.W., at 3 h. 5 m. the banks of the stream became very high, and stratified in a singular manner: the thin strata of the lower rocks being inclined and dipping to the E., while the superincumbent red sandstone was nearly horizontal. We entered the bed of the stream, and upon examination two seams of coal were discovered, one about 5 and the other 6 feet in thickness, with several beds of shale and sandstone. Having pitched the tent and tethered the horses, we commenced collecting specimens of the various strata; we succeeded in cutting out 5 or 6 cwt. of coal with a small axe, and, in a short time, had the satisfaction of seeing a fire of Western Australian coal burning cheerfully before the tent. Lat. by account $28^{\circ} 57' 10''$; long. by account $115^{\circ} 30' 30''$.

10th.—At 7 h. 20 m. followed the river, the general course of which was N. 250° E.; at 7 h. 40 m. crossed to the left bank: the valley became wider and the soil of a much better quality, being formed of decomposed bituminous shale and gypsum, producing luxuriant oat and rye-grass; at 9 h. 10 m. crossed to the right bank, and steered N. 220° E., to an abrupt headland on the N. side of the valley, about two miles wide; the soil a stiff brown loam, with rounded fragments of granite, quartz rock resembling burrstone, and flinty trap; the grass was much improved, being principally of perennial species. At 9 h. 50 m. halted on the top of the hill for 20 minutes, and then turned N. 200° E.; at 11 h. 15 m. again crossed to the S. bank, and then changed the course to N. 235° E., the grassy flats extended nearly 2 miles back from the river; at 11 h. 55 m. ascended a sandy ridge with a few gum-trees on the summit; the valley now narrowed considerably, the flats averaging half a mile in width, and backed by elevated sandy downs, producing short scrub and grass. The course of the river was now about N. 230° E.; at 1 h. 35 m. we ascended a remarkable red sandstone hill, with a table summit and steep rocks on all sides; it nearly blocked up the valley. At 2 h. 15 m. left the hill, steering a general course of N. 242° E. along the river; at 4 h. 5 m. bivouacked in a rich grassy flat, thinly timbered with a white-stemmed species of eucalyptus. Lat. by observation $29^{\circ} 10' 42''$; long. by account $115^{\circ} 15' 15''$.

11th.—Started at 7 h. 40 m. A.M., and steering N. 240° E., crossed the river, and at 7 h. 55 m. left the grassy flat, and crossing undulating sandy downs halted at 8 h. 45 m. to ascend a steep red sandstone hill, or rather cliff, from the top of which we had a

distant view of the ocean; the river was observed $1\frac{1}{2}$ mile to the S., and a large branch appeared to join it about 2 miles below our bivouac. At 9 h. 30 m. steered N. 267° E., over open sandy downs; at 10 h. 35 m. struck the river, running northward through beautiful grassy flats, timbered with York and white gum and wattles; there were many fine pools of water, which appeared to be of a decidedly permanent character. After an unsuccessful attempt to cross the stream from the soft boggy nature of the channel, we followed it N. till 11 h. 0 m., when it turned W.N.W.; at 11 h. 20 m. W.S.W.; at 11 h. 45 m. crossed to the S. bank; it now trended W. b. S. till 25 m. P.M., through a rich limestone valley; the river then turned W. Steering W. by S. we ascended a sandy limestone hill, with scrub and a few small Banksia; after a halt of 15 minutes, at 1 h. 5 m. left the hill, and turned N. 248° E.; at 1 h. 30 m. struck the river, and again halted for 20 m. We then followed the stream, the general course being N. 260° E., and at 3 h. 40 m. arrived at the mouth of the river, which was choked up with sand and rocks. I conceive this river to be the 'Irwin' of Captain Grey, as this spot is only $1\frac{1}{2}$ mile S. of the position assigned to that river on Arrowsmith's chart of this part of the coast. At 4 h. 30 m. we left the beach, and retracing our steps at 5 h. 50 m. bivouacked at the spot where we crossed the river at 1 h. 30 m. Lat. by account $29^{\circ} 15' 10''$; long. by account $114^{\circ} 59' 0''$.

12th.—At 7 h. 50 m. resumed our journey up the river, steering N.E. till 8 h. 25 m., and then E. along the N. bank of the river, through rich flats covered with fine grass, and timbered with York gum. At 10 h. 20 m. left the river and entered the sandy downs on the N. side of the stream; at 10 h. 30 m. crossed a small valley with some fine springs; at 11 h. 0 m. changed the course to E. by S., and at 11 h. 50 m. passed $\frac{1}{2}$ mile N. of the sandstone cliff we had ascended at 9 h. 0 m. the preceding day. Altering the course to N. 83° E., at 12 h. 50 m. crossed the river, where it is joined by the S. branch, which is of equal size with the northern one. Following the southern branch, which runs through wide grassy flats backed by sand-downs, at 2 h. 0 m. halted for the remainder of the day. Lat. by account $29^{\circ} 11' 20''$; long. by account $115^{\circ} 17' 45''$.

13th.—At 7 h. 55 m. crossed the river, and holding a course N. 160° E. over a sandy country of considerable elevation, at 11 h. 45 m. halted for half an hour, and shot a large kangaroo, which proved a welcome addition to our stock of provisions. At 1 h. 30 m. changed the course to N. 142° E., and at 2 h. 30 m. struck a running stream 3 yards wide trending to the W. This is probably the 'Arrowsmith River' of Captain Grey. Here we bivouacked, as it did not appear likely we should meet with water again for

the next 10 or 15 miles. The country on the banks of this stream is sandy, without timber, and covered with scrub, except in the bed of the river, where the grass is abundant, but rather thick with brushwood. Lat. by observation, $29^{\circ} 27' 9''$; long. by account, $115^{\circ} 27' 45''$.

14th.—At 8 h. 35 m. left the bivouac, steering N. 160° E. over sandy downs, with ridges of red sandstone, till 3 h. 0 m., when we altered our course to N. 220° E., and, following down a valley, at 4 h. 0 m. turned W.S.W., and bivouacked at 5 h. 15 m. by a swampy patch with good grass, and water by digging. Lat. by account, $29^{\circ} 48' 10''$; long. by account, $115^{\circ} 32' 30''$.

15th.—Leaving our bivouac at 8 h. 0 m., steered N. 214° E. through a scrubby country, with patches of white gum forest. At 9 h. 50 m. turned N. 160° E., over a sandy and ironstone country, covered with scrub, and of considerable elevation; at 3 h. 30 m. turned N. 170° E., and followed down a valley; at 5 h. 0 m. turned N. 115° E.; and at 5 h. 30 m. bivouacked at a native well in a patch of York gum.

16th.—As the only food for the horses at this place consisted of white everlasting flowers and scrub, we determined to proceed, although they showed some symptoms of fatigue; we therefore started at 7 h. 20 m., steering N. 160° E. The country was more broken by valleys than any we had passed over since we left the Irwin; the soil generally sandy, with ironstone-gravel, producing scrub, a few *Banksiæ* and grass-trees, and occasional patches of gum forest. At 10 h. 30 m. turned N. 135° E.; and at 11 h. 40 m. N. 138° E. towards a high hill about 12 miles distant; at 2 h. 20 m. turned N. 180° E., and entered an extensive piece of level sandy country surrounded on all sides by hills; at 3 h. 40 m. changed the course to S.W.; at 5 h. 0 m., one of the horses being unable to proceed farther, we were compelled to leave him, and continue our route in search of water, the only chance of saving him; at 5 h. 50 m. passed a small salt lake with some grass on the western side; at 6 h. 0 m., finding the country more scrubby and less chance of obtaining water or grass, returned to the salt lake and bivouacked at 6 h. 30 m. on the western side.

17th.—After digging in ten or twelve places around the lake, we succeeded in obtaining fresh water on the N. side; we therefore went back to the horse we had left the preceding evening, and, finding him able to move, brought him up to the well. Having an abundant supply of water and grass, we determined to rest the horses this and the following day.

19th.—Leaving our bivouac at 8 h. 5 m., steered N. 160° E., and soon ascended elevated sandy downs, with a few *Banksiæ* and *floribundæ*; at 11 h. 45 m. crossed a valley trending W.; at 1 h. 5 m. observed a range of high wooded hills to the E. and S., and

altered our course towards a remarkable gorge which bore N. 129° E.; at 3 h. 30 m. entered a gum forest; at 3 h. 50 m. struck a large stream-bed with many pools; following down this stream to the S., at 4 h. 40 m. bivouacked on its right bank. Lat. by observation $30^{\circ} 42' 39''$; long. by account, $116^{\circ} 0' 0''$.

20th.—At 7 h. 30 m. A.M. crossed the river, which appeared to be a branch of the Moore River, and, steering N. 160° E. through a grassy gum forest, at 8 h. 0 m. came on an open scrubby hill, at the top of which we arrived at 8 h. 20 m. Here the country changed to a grassy forest. At 8 h. 55 m. ascended a rich grassy hill, the soil a brown loam, with fragments of trap and granite rocks in great abundance. This description of country continued till 12 h. 0 m. The hills were timbered with York-gum and jam-wattle. Many large stream-beds were crossed, all trending to the W. At 12 h. 15 m. the country became scrubby, the hills were ironstone, gravel, and sand, timbered with white gum; at 2 h. 20 m. entered a valley of better character, with quartz and granite rocks; after crossing several steep rocky ridges, at 3 h. 20 m. crossed the main branch of the Moore River, and bivouacked at 3 h. 25 m. This was the first place where we had observed the poisonous *Burtonia*. Lat. by observation, $31^{\circ} 0' 39''$; long. by account, $116^{\circ} 12' 45''$.

21st.—Leaving our bivouac at 7 h. 40 m. A.M., followed up the stream N. 130° E.; at 8 h. 0 m. passed a deserted sheep station. Here the river made a sudden bend to the N., we therefore left it, and continued N. 130° E., over broken ironstone country, timbered with white-gum and grass trees. A few grassy hills were seen to the northward. At 10 h. 0 m. the country became more level and sandy; at 11 h. 45 m. came on the road from Bolgart Spring to Victoria Plains. Following the road S., at 11 h. 55 m. halted for an hour and a half at a small stream-bed trending to the N.E. We then continued our journey along the road, the general direction being S.E. by S. The country is level, and timbered with white and red gum. At 3 h. 35 m. crossed a small stream-bed, one of the heads of the Toodyay Brook. The country here improved. At 4 h. 5 m. bivouacked at a spring close to the road. Lat. by observation, $31^{\circ} 14' 19''$; long. by account, $116^{\circ} 34' 0''$.

22nd.—This morning an hour's ride brought us to Bolgart Spring, after an absence of 47 days, during which we had travelled about 953 miles, traversing 3 degrees of latitude and nearly $4\frac{1}{2}$ of longitude.

V.—*Report by Lieut. Helpman, R.N., Commander of Colonial Schooner Champion, on an Expedition to examine Coal discovered on the Irwin River. 1846.*

[Read 13th Dec. 1847.]

HAVING received the horses and cart, together with the necessary supplies, on board, I left Fremantle at 5 A.M., December 4th, and, with a fine steady breeze from the S.E., kept well in sight of the coast as far as Jurien Bay, keeping up a chain of bearings. Numerous small islands and reefs front the coast about 4 or 5 miles off shore, from a few miles north of the Winding Sheet to this bay.

December 6th.—At 9 A.M. we anchored in Champion Bay, and immediately commenced landing the horses, cart, &c. We saw several native fires in the Chapman, and at 11 A.M. were met by 17 natives, who were particularly friendly, and showed us water at the back of the large white sand-patch. This was very fortunate, as we failed in getting any by digging. At 2 P.M. another party of natives joined, making 26 in number: they were remarkably fine men. Whilst we were at dinner, they succeeded in stealing three small tomahawks, and had got clear away with two before discovery; the third we found partly buried in the sand. When they first came down the horses astonished them very much, particularly when they came swimming on shore.

7th.—At 5 A.M., having all quite ready, we left, and keeping S.S.W. $1\frac{1}{2}$ mile, came on the beach at Port Grey, which we followed to Point Grey, a small, low, rocky point. We turned E., and immediately came to the dry sandy bed of the Greenough. That this bay is the Port Grey I am confident, and its appearance fully bears out Captain Grey's opinion. It has an extensive reef running S. from Point Moore, and one to the N. from Point Grey, and a centre one leaving a clear opening on each side. Excepting from the high ridge of sandhill and the wide beach, I should have felt positive a good harbour was to be found here. The northern part offering a snug appearance, I was anxious to have it sounded.

The natives who had been with us yesterday followed to the Greenough, and on this occasion brought their women. They showed a small well of water, which was very indifferent. The water of the river lay back about 150 yards, and was quite salt. We kept on the left bank of the river, which for the first 3 miles was about 50 yards wide. From a high sand-hill we saw the river still trending to the S.E., and the coast-line was quite visible, having a small ledge about 6 miles off. At 4 h. 15 m. we halted at the bed of the river, where we found a native well, and, clearing it out 4 feet deep, we obtained good water.

8th.—Left the encampment at 6 h. 15 m. A.M., and followed the right bank over the same kind of country as yesterday till 7 h. 10 m., when we crossed the bed (being 20 feet deep and 50 feet wide). We came now upon a fine open piece of land, extending from one side of the plain to the other $1\frac{1}{2}$ mile, the general course S.E. At 7 h. 15 m. we passed a break in the eastern hills, probably the main channel of the river, as after this the bed was scarcely discernible: at noon we were at the head of the valley. Shortly after entering the scrub we came to a very singular natural basin in the limestone rock; it was about 50 yards in diameter, and 20 feet deep. Mr. F. Gregory went to the top of the highest and nearest sand-hill, and saw that the only route was by turning to the N.E. by N., over low ridges of very scrubby limestone country. We were now close to Mt. Hill, and the country, so far as we could see, had much the appearance of that we were on. We had considerable difficulty in passing over 5 or 6 miles of this, and at 6 halted quite fatigued.

9th.—Keeping in a S.E. by S. direction over a wretched country, very thinly timbered, at 6 A.M. we came on the high land dipping to the S.E. towards the Irwin, descending which we came on a small flat, and at 6 h. 40 m. passed through a gum-forest; at 7 we passed along the side of a sandy ridge,—a few small flats well-grassed and numerous warren-holes were passed; at 8 h. 30 m. flights of white cockatoos and a well-defined line of trees clearly showed the river at no great distance. We here met with the first native hut; it was well *plastered* outside, about 6 feet high inside, and capable of containing 10 persons easily. At 9 h. 40 m. we came to the Irwin, and found water in small pools. The banks were about 30 feet high, and the river 80 yards wide, although in ordinary winters I do not think the water runs over the whole of it; the banks were limestone and clay; the bed coarse sand, with trees growing in it; the lat. $29^{\circ} 13' 50''$.

11th.—At 6 h. 15 m. left in an E.N.E. direction, and in 10 min. crossed the flat, and ascended the high sand and scrub-hills, along which we continued at an average distance of $\frac{2}{3}$ of a mile from the river, till 8, when we turned E., and at 8 h. 40 m. came on extensive warren-grounds on the edge of a fine wide grassy flat, through which the river runs; this we followed till noon, when we halted for a short time at a well, in which we found good water 2 feet 6 inches below the surface.

We remained here till 3 h. 35 m.; and, as we were anxious to know how far we could be certain of water, Mr. Gregory and myself kept near the river while the cart made for a very remarkable piece of land, which had much the appearance of an island. The valley of the river was very small; the higher route in which the cart kept was ironstone and scrub. We found plenty of water

in pools under the cliffs at this point, which we reached at 5, when we encamped at a very pretty spot, the valley narrowing in until the hills nearly met. We were here received by a party of natives, who came without any hesitation to welcome us. They were not in the least surprised or so curious as the others had been, and were much inferior in appearance to our friends at Champion Bay. As some of our men were suffering from sore feet, the cart not in very good condition, and water not at all to be relied on, I was obliged to divide the party. The natives encamped on the opposite side, and were very quiet. Latitude $29^{\circ} 9'$.

12th.—Leaving six of the party with all the spare provisions, lightened the cart, and enabled us to push along much faster; we kept about N.E. near the river, over a scrubby, hilly country, till 8 h. 30 m., when we passed a range of wooded hills running from the S., which came close down to the river. At 8 h. 40 m. we came to a pool of fresh water; a native well was found close to the edge of this, out of which some pieces of shale had apparently been thrown; but, as none could be found elsewhere, I presume these must have been washed down. At 9 h. 50 m. we passed another pool: the river had here worked a deep channel through clay and red sandstone.

All the ranges were flat-topped, with very abrupt terminations, giving a singular appearance to the country. We were now crossing a belt of tolerably good grassy country, extending for a few miles in a S. direction, most probably to the South Irwin. We continued on a course for the end of a high range, passing over during the latter part a very poor piece of land covered with trap, granite, and quartz. At 12 h. 45 m. we ascended the first table-land, consisting of sandstone and ironstone. This range extended S.S.E. for many miles, and had a dark line of red sandstone running along it about 12 feet from the top. On reaching the summit we found it very scrubby, and difficult to pass with the cart. Several deep gullies ran into the high land, one of which we crossed, but headed the others. This occupied a long time, and it was near 3 before we came to the deep gully in which the coal was, and in which the river runs. The ranges are composed of red and white sandstone; the few trees in the valley were stunted, principally of white gum and wattle. At 5 we went down to the coal. The valley, about three-fourths of a mile wide, was well-grassed, and we found plenty of good water by digging a few inches. The river is here about 25 yards wide, running through sandstone and shale of different kinds. Salt water was lying on the coal in small quantities. The coal-fire made by Messrs. Gregory had left nothing but very fine ashes and no cinders. The latitude of the bivouac, which was on the edge of the table-land, half a mile S.S.E. from the coal, was $28^{\circ} 57' 42''$.

13th.—We were not long in digging out about 3 cwt. of coal from about 4 feet deep; the seam was nearly 6 feet thick, and ran entirely across the bed of the river and under the bank on both sides. At the well, which was a quarter of a mile higher up, very good shale was dug.

At 11 we were ready to return, having 3 cwt. of coal in the cart. We shortened our route over the table-land by avoiding the gullies, and found it a very easy road; the thick brushwood made walking rather uncomfortable, but it was easy for the cart. Descending these ridges, we kept nearer the river than in going, and found much better travelling. The upper pool was reached at 2 h. 30 m., and at 5 we again moved on, passing close to the river over well-grassed flats, till we came to the depôt hill, which we reached at 8, and found the party quite well, but they had been dreadfully tormented with flies. The natives paid them but one visit, and had all decamped in the morning. The cart, unfortunately, was capsized just before it came in, and was much injured. It was not in good order before; but this shake rendered it doubtful if we could take it back, more particularly weighted as it now was.

14th.—The flats we passed were all well grassed, and the travelling very easy; at 11 h. 15 m. we halted at the marked tree, the water in the well still plentiful. The heavy dews and sharp cold nights had given us all colds. We remained here to rest the horses; they were looking a good deal knocked up.

15th.—At 5 h. 30 m. we started for the pool, passing close to a high piece of table-land over a very scrubby country. Two kangaroos rewarded our sportsmen for their early labour; they were the only ones killed; we had seen but few, not a dozen in all. At 11 h. 15 m. we reached a pool about one mile lower down than the one we had previously stopped at. We crossed a small gully close to this, on the upper part of which Mr. Gregory saw a spring in his last trip. The flats here are about a quarter of a mile wide, of a good light soil, and well grassed.

16th.—At 3 h. 30 m. commenced packing, and at 6 h. 10 m. started; a few natives followed us; ten minutes' walking took us to the scrubby limestone hills. Preserving a course about 329° we gradually ascended and kept on the high ground. I was desirous to pass the valley where we supposed the Greenough ran to the eastward. At 10 h. 45 m. we crossed a small watercourse trending to the westward, Mount Hill 335° . At noon we changed the course to 303° , and at 1 stopped for dinner in a small flat well grassed and extending to the S.W.; clumps of wattle acacia were frequent. At 2 h. 15 m. started on a N.W. course, at 3 h. 5 m. ascended a small sand hill and saw into a valley about a quarter of a mile wide, extending N.N.W. In a small open

piece of ground surrounded by clumps of wattle, we found several wells of considerable size, about 8 feet deep. We halted here for the night.

17th.—At 6 we were once more under weigh, and at about 8, after passing over a very mixed country, but generally scrubby, came into a large valley extending to the N.W.; this was very similar to the one through which we walked on our way up the first day, though not so extensive; we were not long, however, before thick brushwood compelled us to get on the high land, a short distance only from the valley we were endeavouring to look into. The higher land was very scrubby and of limestone. We shortly came to the Greenough, running in a westerly direction, and most probably from Wizard Peak; it was quite dry. Passing this, we came upon the level country of the first day, and at 3h. 30m. halted at the limestone well, where we remained for the night.

18th.—Left at 6 h. 15 m., and following the old route, reached the beach in Champion Bay about noon. The vessel had experienced very heavy S. and S.S.W. winds, the barometer constantly low, but fine bright weather. From the summit over Point Grey, we had a clear view of Port Grey; the southern part does not offer the least protection for vessels, a heavy surf rolling in, but the appearance of the northern part was very favourable.

The cart was now in too dilapidated a condition to be taken round Moresby's flat-topped range, and as the three horses would move over the ground fast, and enable the country S. of the Hutt to be examined, I considered it best to let two of the Messrs. Gregory and Lieutenant Irby, who volunteered, accomplish that part of my instructions, whilst Mr. J. Gregory and myself examined Port Grey.

20th.—At 8 the party started, and the forenoon was occupied in taking the cart and things off, and getting the boat ready for Port Grey: it however continued to blow a gale of wind from the southward until the 22nd, when I passed round Point Moore, and into Port Grey. There is plenty of room for boats between the reefs and the point. We found the part between the long reefs from Point Moore and the reef running off from the land foul, and although there was not much wind, it was breaking in 5 fathoms. This I account for by the fact that the reefs are not level with the water, and the outer side of them having 14 fathoms close to them in a very heavy swell.

A very snug little harbour is formed by the reef extending from the land in the depths of the bay. It was quite smooth, the reef was dry, and we had plenty of water close to it (2½ fathoms). The point of this natural jetty shuts in with Point Grey, bearing S. by E., so that no wind could hurt. I consider this little place

admirably adapted for small coasters; the fresh water is close to it, and an anchor could easily be landed on the jetty, to which they would secure. The passages between the outer reefs are quite clear. The return of very strong breezes compelled us to get into Champion Bay, for, after we left the small bay, the sea ran so high that it required one man constantly to bale the boat.

At 1 the three horses were seen near the Chapman, and by 2 the exploring party were down. Messrs. Gregory's report was highly favourable: they passed over an excellent country, as shown by the subjoined journal.

20th.—At 6 h. 30 m. started from Champion Bay, following the beach till 6 h. 35 m., when we turned N. 87° E. over a scrubby country; at 7 crossed the Chapman, at 8 Mount Fairfax bearing S. $\frac{1}{2}$ mile; turned N. 66° E., the country very thinly dotted with wattle, scrub, and some grass. At 8 h. 30 m. crossed a large branch of the Chapman with several small pools of water, the banks high and steep; the country then became more scrubby, with gravelly soil; at 9 altered our course to N. 18° E. and at 9 h. 30 m. crossed the Chapman, below a small pool of water apparently permanent; 9 h. 50 m. passed over a granite ridge, when the country improved and several fine patches were seen to the eastward; at 10 h. 20 m. ascended a high flat-topped hill of red sandstone resting upon granite, which proved to be the eastern part of Moresby's flat-topped range; from this summit Mount Fairfax and Wizard Peak were visible. To the eastward the hills were apparently grassy and gradually rose from the Chapman for 8 or 10 miles; at 11 came on a large party of natives, some of whom accompanied us for one mile, pointing out several places where we could obtain water; at 11 h. 10 m. turned N.E. and entered an extensive valley with patches of grass, but not of a good quality; at 30 m. crossed a watercourse trending to the westward; following it for half a mile, we turned N.W. over a scrubby flat till 1 h. 5 m., when we struck the bed of a small stream, with several small pools of water in it. Halted for dinner, then renewed our route up the stream to the northward; at 3 it turned to the east, we therefore halted for the night by a small pool with good feed on the banks.

21st.—At 6 h. 35 m. continued our route N. over a hilly country of scrub and grass, with York gums and wattle; the prevailing rocks were quartz, red sandstone, and granite; at 8 h. 30 m. crossed the bed of a stream 8 yards wide with brackish pools; at 8 h. 50 m. came upon a good grassy country, which appeared to extend 8 or 10 miles E. and N. Clumps of York gums, sandalwood, jam, and black wattle were observed on some of the hills; crossed several inconsiderable watercourses, some trending E. and others W., till 9 h. 45 m., when we ascended an elevated

sandy table-land covered with short scrub; at 10h. 35m., not seeing any immediate improvement to the northward, changed the course to the west; following a deep gully, we struck a small stream trending S.S.W. with numerous small pools of brackish and salt water, traced it down till 11 h. 25 m., when we found a small hole scratched in the bed between two salt pools; the water in the hole was perfectly fresh. Halted till 12 h. 53 m. when we resumed a westerly course, crossing several deep grassy valleys running to the S. At 1 h. 35 m. turned 211° over a hilly quartz and granite country, with very good grass in the valleys and on the tops of the hills; at 2 h. 30 m. again struck the stream bed, the country improving, being covered with grass and thinly scattered jam and black wattle as far as the eye could reach. At 3h. 50 m. this stream being joined by another from the eastward, turned N.N.W.; following its course, at 4 h. 30 m. passed a brackish pool, and at 5 bivouacked in the bed of the stream, obtaining water by digging a few inches in the sand.

22nd.—At 6 left our bivouac and steered 210° over a fine grassy country; at 7 ascended a small ironstone hill, from which we observed a deep valley trending S.W. In the N. and W. the grassy country extended for at least 10 or 12 miles, presenting to our view 50,000 or 60,000 acres of sheep pasture of a fine description; continued a S.W. course over a granite country with some good patches of grass, but not equal to that passed yesterday; at 8 crossed a small stream bed, which we considered to be the Bowes of Captain Grey; we then ascended the steep limestone hills on the western bank of the stream, from which we observed the large sandpatch on Point Moore bearing 170° ; turning south we crossed the mouth of the Bowes, quite dry, then altered to S.E., with the intention of tracing Captain Grey's route towards Champion Bay; after traversing sandy downs resting on limestone, about 4 miles, came on a deep ravine in the limestone hills: one of the horses being footsore we were obliged to return to the beach, which we followed to Champion Bay, where we arrived at 1, passing the mouths of the Buller and Chapman, and another small stream.

23rd.—Employed getting the horses on board, before the northerly wind got too fresh; they looked a good deal fatigued; by 9 we were under weigh, and with strong headwinds did not reach this until 27th.

With regard to the practicability of getting the coal down, I think there can be no doubt it could be done; the road by which we returned offered no difficulties but such as would easily be surmounted; the chief one would be the gullies, running out from the table-land near which it lay, but this would be very easily done, by a road being cut at the foot; that there is plenty

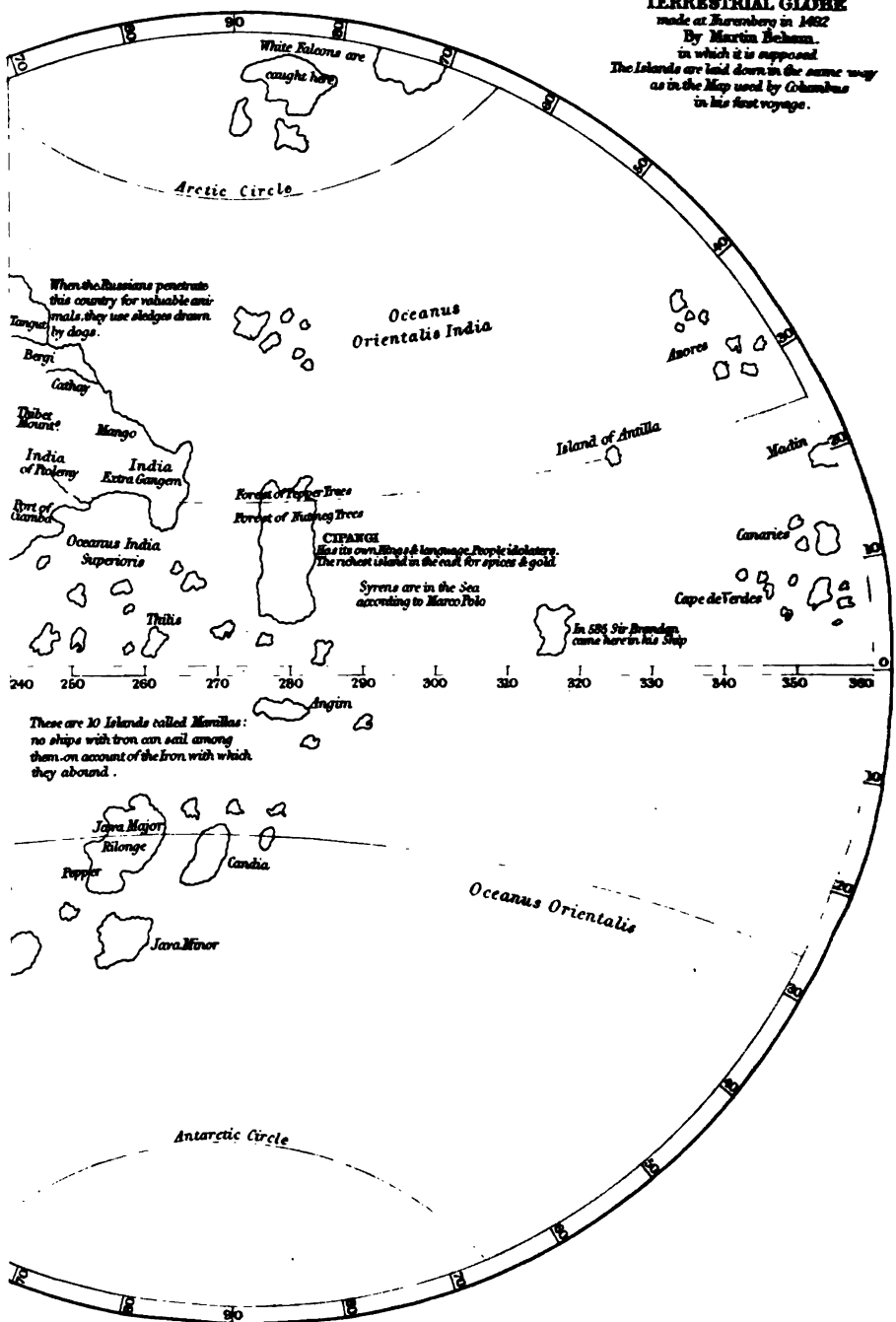
Part of a
TERRESTRIAL GLOBE

made at Nuremberg in 1492

By Martin Behaim

in which it is supposed

The Islands are laid down in the same way
as in the Map used by Columbus
in his first voyage.



John Arrowsmith

of coal there can be no doubt, and the river running over what we saw would not be a difficulty, as the shaft could be sunk on either bank.

I have several reasons for supposing Champion Bay safe during winter, although open to the northward and westward; the first is the low sand beach, then the vegetation growing close to the high water mark, say 20 yards, whilst all the beach to the southward of Point Moore was blown into high ridges, and was generally about 30 or 40 yards wide: from all I observed I should say that if northerly gales reach there, they must be very much more moderate; but in Port Grey there was evident proof of the effect of southerly winds.

The small snug harbour in Port Grey is quite sheltered, and admirably fitted for small vessels loading or unloading.

There was a great want of timber over the whole country; but I do not think there is any doubt that water could be obtained anywhere.

Fremantle, 31 Dec. 1846.

VI.—*Memorandum respecting an old Globe (supposed date about 1520) in the Public Library of Frankfort-on-Maine; brought there from a Monastery about sixty years ago. By Mr. H. BLANCHARD.*

DATE of discoveries (America).

America.—Columbus (born 1435) left Palos on the 3rd of August, 1492; by the 7th of October he had sailed 750 leagues to the westward of the Canaries, and expected to find the island of Cipangi (Japan). He discovered land that evening, viz., St. Salvador, one of the Bahamas; he arrived at Cuba on the 28th of October, still believing himself to be in Asia; and, coasting the N. side of Hispaniola, returned to Spain.

On the 25th of September, 1493, he sailed on his second voyage from Cadiz; made Dominica and Guadaloupe, surveyed Hispaniola, Jamaica, and Cuba, and returned.

On the 20th of May, 1498, he sailed from St. Lucar on his third voyage; made Trinidad and the main land adjacent, thence bearing up for Hispaniola, he returned to Spain under arrest. During this voyage Ojeda sailed from Spain (having Amerigo Vespucci on board his ship) on a voyage in which he coasted from Trinidad to near Darien.

On the 9th of May, 1502, Columbus sailed on his fourth voyage from Cadiz, his attention being wholly directed to discover the strait which he supposed to exist between N. and S. America. He

reached St. Domingo; thence sailed to the Bay of Honduras, near Truxillo. On his passage down he met a large canoe, which urged him to proceed westward, where he would find a rich and cultivated country (Yucatan and Mexico), he coasted the Musquito shore from Truxillo to the Bay of Panama near Darien, thence he returned to Cuba; and to St. Lucar in Spain, on the 7th of November, 1504; believing he had been very near the mouth of the Ganges. He died the 20th of May, 1506, believing to the last that he had discovered the regions of the East, and that Cuba and Terra firma were the eastern parts of Asia.

Vincente Pinzon sailed early in December, 1499, from Palos. Passing the Cape de Verdes, he steered S.W., and in 8° S. lat. made Cape St. Augustine, Brazil; thence coasting N., he discovered the mouths of the Amazon and Orinoco, and, passing the Boca del Drago, proceeded to Hispaniola, and thence returned to Spain, arriving in September, 1500.

In 1506, and again in 1508, Vincente Pinzon undertook expeditions to find the strait or passage supposed by Columbus to lead from the Atlantic to a southern ocean; no such passage, however, exists.

Ojeda sailed on a second voyage in 1502, and explored the Gulf of Paria to the Bahia Honda. He sailed again in 1509 with a commission to found colonies between Paria and Darien (*on this expedition Pizarro accompanied him*). The following year Nunez de Balboa followed him, and succeeded to his command; and, hearing a report of the South Sea, led a party (*including Pizarro*) across the isthmus, and discovered it the 26th of September, 1513. He embarked on it, visited the Pearl Islands in the Bay of Panama; and, receiving information that the coast extended far to the N., and that there was a large and civilized nation to the S., he returned to Darien.

Subsequently (about 1518) Pedrarias built Panama on the South Sea, and in November, 1524, Pizarro embarked on his expedition for Peru.

The recent researches of the Danish Antiquarian Society have shown that the Northmen of the tenth and eleventh centuries visited Greenland, Newfoundland, and probably as far as Nantucket; in the thirteenth century they appear to have reached further S., but no evidence appears of these voyages being known to Columbus.

John Cabot sailed on a voyage of discovery from Bristol (during Columbus's second voyage) in 1494, and returned on seeing Newfoundland. He obtained a patent from Henry VII., under which his son, Sebastian, sailed in May, 1497, in search of a N.W. passage to India. He reached 67° N., finding the sea

quite open; but his men mutinying, he bore to the S. till he came to 38° N. on the coast, which he expressly says was afterwards called Florida, having seen the *continent* of America, which Columbus only visited the following year.

In 1512 Don Juan Ponce de Leon took possession of Florida, and so named it on behalf of the King of Spain.

Sebastian Cabot subsequently entered the service of the King of Spain, in which he discovered the River Plata, and sailed up it 360 miles; on this he was made Grand Master of Spain, but he afterwards returned to the English service.

Cabral sailing from Portugal for the East Indies in 1500, stood so far to the westward that he fell in with land, which proved to be the Brazils. They coasted it S. to Porto Seguro in 15° S. lat.

Magellan sailed from Seville on the 10th of August, 1519, declaring his belief that there must be a passage to the S. similar to what he believed Sebastian Cabot had found to the N.; he wintered in 49° S., and first observed the Patagonians. He entered the South Sea on the 28th of November, 1520; then sailing three months and twenty days in a N.E. direction, he arrived at the Ladrões on the 10th of March, 1521. Here he was killed, and his ship arrived at San Lucar the 7th September, 1522.

Hernandez de Cordova sailed from Havannah on discovery the 8th of February, 1517; and, passing Cape Catoche, proceeded along the W. coast of Yucatan to Campeachy and Potanchan, but losing many of his men by an attack of the natives, he returned to Cuba.

John Grijalva sailed from Cuba on the 8th of May, 1518; following the same course, he coasted the Bay of Campeachy and Mexico to San Juan d'Ulloa, and returned to Cuba.

Hernando Cortes sailed from Havannah on the 10th of February, 1519; and, making conquests along the coast, founded Villa Rica de Vera Cruz, and sent his first tribute and dispatch to Spain on the 16th of July, 1519.

Remarks.—The annexed memoranda of the discoveries made during the thirty years immediately following the discovery of America by Columbus, together with the few appended remarks on the different voyages and travels which had indirectly brought information of the existence of distant countries, will probably be the best means of forming an opinion of the date of the globe alluded to.

At the period it was made, information frequently travelled slowly, but considerable research must have been used to form it. In assuming the date of 1520 as about the period, that year embraces the knowledge of all that Columbus ever attained—of the discovery of the South Sea by Nunez de Balboa—of the River

Plata by Sebastian Cabot—and of the discovery by Cordova of Cape Catoche and Campeachy in 1517; but not of the discoveries of Magellan, who sailed in 1519 and returned in 1522; nor of Cortes, who discovered Mexico in 1519; nor of Pizarro, who left the infant colony of Panama on his expedition for Peru in 1524.

VII.—*Observations upon M. d'Abbadie's Account of his Discovery of the Sources of the White Nile, and upon certain Objections and Statements in relation thereto, by Dr. Beke.* By FREDERICK AYRTON, Esq., F.R.G.S., and Member of the Geographical Society of Paris. Abridged.

[Read January 24th and February 14th.]

“CAPUT Nili quærere” has so long been accepted as a phrase significant of the futility of attempts to discover the sources of the famous river of Egypt, that, perhaps, one ought not to be surprised that a sudden announcement of success, even though professing to be founded upon the positive testimony of personal observation, should be met by incredulousness. Nor is it astonishing that ancient hypothesis, resting on conjecture (which, if experience had failed to confirm, it had equally failed to contradict), should still find an advocate unwilling, on the first summons, to surrender its easily enjoyed speculative conclusions to the stubborn dominion of facts; although these facts are broad and plain, and supported in their credibility by the ready manner in which they range by the side of collateral data, and reconcile the jarring opinions which have prevailed upon this key-stone of African geography from the time of Ptolemy Claudius, who first essayed to fix it definitively, to that of M. d'Abbadie's having announced his final discovery of its true position. But the question, as is well known, had an interest long anterior to the time of Ptolemy the geographer: Sesostris, Cambyzes, Alexander, Ptolemy Philadelphus, Cæsar, Nero, and not a few besides, who have sought to leave for the chaplet of their future fame a record of their discovery of the sources of the Nile, have failed in attaining this object of their ambition. For thirty centuries had men set themselves in vain to solve this great geographical problem; and what neither the authority of kings nor the researches of philosophers could previously effect, two private travellers, aided by no influence, by nought save their own personal means, intelligence, patience, perseverance, untiring energy and enterprise, have at last accomplished.

Such were my impressions upon first learning the great dis-

covery made, after nine long years of toil, danger, and privation for its purpose, by the MM. d'Abbadie.

It will be recollected that some fifty individuals have, within the last ten years, appeared as rivals in the field for the same ultimate purpose of discovery with the MM. d'Abbadie. But all, save the MM. d'Abbadie, have failed in the enterprise. From various causes their competitors have found themselves stopped at the first Nile, unable to push their researches beyond it, into the very regions where alone they could hope to profit by personal observation of the circumstances they wished to elucidate. Nor have the MM. d'Abbadie, as suggested, to thank the kindred sympathy of European nations, and their scientific bodies, for the influence which has enabled them to traverse in safety regions which have scared from their face other travellers, who were doomed to stay their course at the hither boundary of the ground where the palm of victory was to be contested. England sent her mission—France her emissaries—both alike returned disappointed. The veil of Isis was not to be removed at the bidding of suitors, who, foregoing their own account, pleaded for nations, which, once foremost in contention to despoil her fanes, now only sought to make her presence the subject of their renewed rivalry, and not till she was approached by an admirer whose devotion to her cause for nine years bespoke the truth of his passion, did she deign to unfold the mystery of her tears.

To pass from metaphor to reality—what is the substance of the discoveries announced by the MM. d'Abbadie, and how have they compassed those discoveries, that their announcement of each step of their progress should have been made the subject of suspicious scrutiny, and a cause for attributing to them, in the outset of their undertaking, motives wholly foreign to its ostensible purpose? In reference to these questions, I propose to examine the nature of the MM. d'Abbadie's discoveries, the objections which have been urged to those discoveries, and the evidence by which they are supported.

To consider, then, the sufficiency of M. d'Abbadie's opinion, as contested by Dr. Beke, of his having discovered the true source of the Nile—the Nilus of the ancients, the Bahr el Abyadh of the Arabs, and the White Nile of European writers,—I conceive the case between M. d'Abbadie and Dr. Beke to stand thus:—

M. d'Abbadie concludes from his researches, while he was at Saka, into the geography of Inarya and the circumjacent districts, that the main stream of the White Nile is formed by the union of the several primary and confluent rivers which he has enumerated (*Bulletin de la Société Géographique, January 1845; Athenæum, Nos. 906 and 1041*) as having their sources in the irregular basin

formed within the mountains of Inarya, which, on the N. and E., separate the waters of this basin from those which fall into the Blue Nile and Hawash, or run towards the Gulf of Aden, and, on the S. and E., from those which, disemboing on the E. coast of Africa, fall into the Indian Ocean.

A part of this mountainous tract to the S.W. of Saka, M. d'Abbadie alleges to be called Gamaro or Gimiro, whence he derives the Arabic appellation for the same mountains, of Gebel el Qamar, el Qomr, or Qomri, signifying, in either form of the last word, "Mountains of the Moon."

He then urges that, as the question of which of the confluent rivers shall be held to constitute the first course of the White Nile, has never been determined by general local consent, he is entitled, in tracing upwards the course of the White Nile, amid its successive confluent streams, to select between any two or more of them, when they meet, that one, for the main stream of the White Nile, which contributes, to the immediately confluent stream, the largest volume of water, and most nearly coincides with it in direction; and, proceeding upon this principle, he states, from personal observation and the most careful inquiry, extending even to the deputing two men specially to visit the rivers Gibe of Lega and Gibe of Inarya, near their confluence, in order to ascertain their relative magnitudes, that the Gibe of Inarya, which flows to the N. of the Gojeb of the same province, is to be taken as concurrent with the upper course of the White Nile; and that, again, the Bora, which is the principal tributary of the Inarya Gibe, is the actual commencement of the White Nile; and that, consequently, the source of the Bora, which M. d'Abbadie, from astronomical observations made by him at Saka, computes to be in $7^{\circ} 49' 48''$ N. latitude and in $36^{\circ} 2' 39''$ ($34^{\circ} 42' 24''$ E. of Paris) longitude E. of Greenwich, is the source of the White Nile.

As directly opposed to the preceding views of M. d'Abbadie, Dr. Beke contends, upon the authority of oral information afforded to M. d'Arnaud, who, in charge of an expedition sent in 1842 by Mahommed Ali, Viceroy of Egypt, for the purpose of exploring the White Nile, ascended its stream to a point in $4^{\circ} 42' 42''$ N. and $31^{\circ} 38\frac{1}{4}'$ E. ($29^{\circ} 18'$ E. of Paris), that the direct stream of the White Nile continued to ascend for one month's journey from that point in a southerly direction, that the true source of the White Nile is to be sought for in the country of Mono Moezi, which, according to Dr. Beke's deductions, based upon certain observations by Mr. Cooley in his 'Essays upon the Geography of the N'yassi,' published in the 15th and 16th vols. of the Journal of the Royal Geographical Society, lies to the S. of the 2nd degree of S. latitude, and between the 29th and 34th degrees of E. longitude.

The Gibe and Gojeb of M. d'Abbadie, and the Shooa-berri of M. d'Arnaud (receiving into their streams the whole of the rivers from Inarya and Kaffa, which flow to the White Nile), are by Dr. Beke assumed to be, the two first, after their confluence in their lower course, identical with the Saubat of M. d'Arnaud, which joins the White Nile on its eastern bank in latitude $9^{\circ} 11' N.$ and longitude $30^{\circ} 34' E.$, and the last a tributary joining the White Nile, yet extending much further S.

Dr. Beke has referred (Athen., No. 1044) to his 'Essay on the Geography of the Nile,' published in the 17th volume of the Journal of the Royal Geographical Society, in which (p. 70), in the course of explaining the errors into which the Portuguese and Spanish writers of the 16th and 17th centuries fell in their attempted identification of the easternmost of the rivers which fall into the Blue Nile, or Nile of Abessinia, with the Nilus of Ptolemy, the conclusion is involved, that the lake of Zambezi (of the Portuguese), situate in the country of Mono Moezi, is the easternmost of the two lakes, which, according to Ptolemy, lie respectively in the course of two rivers that subsequently unite to form the Nilus. The source of these two rivers is said by Ptolemy (lib. iv. c. 9) to be in the Mountains of the Moon; and as the word "moezi," according to Dr. Beke, signifies, in a large class of the languages of Africa, "moon," he infers that the same word supplied a derivation for the Mountains of the Moon of Ptolemy.

Dr. Beke likewise advances against M. d'Abbadie, that upon his first visit to Inarya, in 1844, he asserted that the Gojeb, and not the Gibe, was to be regarded as the origin of the White Nile, and as he does not allow M. d'Abbadie any credit for a sufficient cause for having changed his opinion in favour of the Gibe upon his second visit in 1846, he would appear to suggest that the discrepancy should militate against the sufficiency of M. d'Abbadie's conclusions on both occasions.

Now it will readily be seen that the material issue between Dr. Beke and M. d'Abbadie is not whether this or that river in Inarya, or elsewhere, is to be regarded as the source of the White Nile, but whether the system of waters of the Nile is actually confined to Abessinia; Inarya with the immediately circumjacent districts, which have been assumed by M. d'Abbadie to supply the whole drainage for the upper course of the White Nile; and a tract, comparatively unimportant in respect of the volume of waters supplied by it, to the W. of its course, northward of the point reached by M. d'Arnaud; or whether we are to assign to the Nile a far more extensive system of drainage, and extend its waters into a country to the S. of the 2nd degree of S. latitude.

According to M. d'Abbadie's views, the two Niles S. of their confluence at Khartoum (in $15^{\circ} 37' 10'' N.$) have a relation to

each other very analogous to that subsisting between the Euphrates and the Tigris. In both cases similar formations of mountains and incidents of climate may be supposed to produce on the opposite sides of a culminating ridge two systems of river drainage, of which the rivers of the outer system, that is, the White Nile and the Euphrates, collecting their waters from the larger extent of country lying on the outer side of the curve, and exposed to the earlier effects of the general winds which bring rain, or its equivalent snow, will be larger than the inner rivers, that is, the Blue Nile and the Tigris, which derive their drainage from the lesser space of ground on the inner side of the curve and to the leeward of the culminating ridge.

Dr. Beke's views in the case of the Niles do not admit of this comparison, inasmuch as, by carrying the main stream of the White Nile to an origin far S., and remote from the same mountainous region which on its northern or inner declination transmits its waters to the Blue Nile, the opposite or outer declination of this region is made but of secondary importance to the system of waters of the White Nile; and he must suppose that there is an uninterrupted connection by ascending valleys, through which the main stream of the western or White Nile extends, to a part of Africa to the S. of the 2nd degree of S. latitude, and between the 29th and 34th degrees of E. longitude; whence it would follow that, instead of the mountains of Inarya and Kaffa, in from 10° to 5° of N. latitude, and from 35° to 40° of E. longitude, constituting the point of culmination of the eastern part of Africa, we are to look for the culminating point of this part of the continent in from 29° to 34° of E. longitude, and to the S. of the 2nd degree of S. latitude.

On the right solution of this question will necessarily depend, to a considerable extent, the correctness of our ideas of the physical geography of Africa. In the absence of primary data it is, of course, impossible to do more than recur to those of a secondary order for its elucidation; and as the conclusions to be deduced in this state of our information will involve general rather than minute topographical facts, I propose, without going into local detail (a knowledge of which may be readily acquired by consulting the valuable papers by Dr. Beke and M. d'Abbadie already alluded to), to notice a few leading circumstances, which, so far as they bear upon the general grounds on which I have ventured to put the question, seem to me to direct opinion in favour of M. d'Abbadie; and I do this not without some hesitation, since I fully accord to Dr. Beke's opinions upon the geography of the Nile, the consideration and importance to which his indefatigable researches, physical as well as mental, into that subject, so well entitle them: but then I must not forget that

M. d'Abbadie's conclusions are the fruit of nine years' investigation on the spot, aided by great qualifications for his purpose.

To take the objections by Dr. Beke in the reverse order in which I have cited them, I may first observe, that the discrepancy between M. d'Abbadie's first assumption of the Gojeb being the source of the Nile, and his subsequent conclusion that the Gibe of Inarya is to be regarded as its true source, is, when viewed in its relation to the larger question of the geography of the basin of the Upper Nile, wholly unimportant. The source of the principal affluent of the Gibe is, as now computed by M. d'Abbadie, not more than 30 miles N., and as many E., of the source of the Gojeb, according to his computation of the position of that source in 1844: it is therefore a mere question as to which of two contiguous valleys may supply the larger affluent to their lower united stream, and if either one or the other supplies the source of the White Nile, the discovery of them both must be held to include the discovery of the source of the White Nile.

In objecting to M. d'Abbadie's derivation of *Gebel el Qamar*, or *Qomr* from the name, *Gamaro* or *Gimiro*, of the country, I cannot think that Dr. Beke has in any degree weakened M. d'Abbadie's hypothesis, by advancing that the derivation to Ptolemy and the Arabian geographers of the name of the mountains whence the Nile has its source, is to be sought for in the word "*Moezi*," because that word is alleged to signify Moon in some of the languages of Africa, and there happens to be a country of that name, to the south of the line, more nearly corresponding than *Gamaro* with the position assigned by Ptolemy to his *Σελήνης Ορος*.

The positions in *Æthiopia* recorded by Ptolemy cannot thus be made use of singly and independently of each other, when endeavouring to show the applicability of a particular position of Ptolemy to some particular place. The errors in his latitudes and longitudes are too great to admit of that simple method of using his authority. Thus the latitudes and longitudes, as given by Ptolemy (lib. iv. c. 8, 9), of the junction of the Nilus and *Astaboras* (White and Blue Nile), of the *Coloë Palus* (*Dembea Lake*), and of the *Lunæ Montes*, are, reckoning the longitudes from the meridian of the island of *Ferro*—

Junction of Nilus and <i>Astaboras</i>	. . .	12° N., 61° E.
<i>Coloë Palus</i>		0 69 E.
<i>Lunæ Montes</i>		12½ S., 57° to 67° E.

The true latitudes and longitudes of the junction of the rivers, and of the lake, reckoning the longitudes from the same meridian, are—

Junction of Nilus and <i>Astaboras</i>	. . .	15° 37' N., 50° 47½ E.
<i>Coloë Palus</i>		12 0 N., 55 30 E.

So that Ptolemy placed the junction of the two rivers $3\frac{1}{2}^{\circ}$ too far south, and 13° too far east.

Even were we to make the corrections in Ptolemy's latitudes and longitudes due to his having taken a degree of a great circle of the earth at 500 instead of 600 stadia,* we should still fail to reconcile many of his positions with truth, or relieve them of the errors springing, as Dean Vincent observes, from his vague method of calculating distances, by the estimate of travellers and merchants, and the number of days employed in their journeys by land or voyages by sea. In some instances of places which may be supposed to have been more familiarly known than others to Ptolemy, a retrenchment, in the proportion of 600 to 500, will eliminate much of the error of longitude; as in the case of Alexandria, where a deduction of one-sixth from Ptolemy's longitude of $60\frac{1}{2}^{\circ}$ would leave $50\frac{1}{2}^{\circ}$, which is only about $2\frac{1}{2}^{\circ}$ too far to the E. of Ferro. But his latitudes are in many cases more irreconcilable than his longitudes. Alexandria and Syene are placed by Ptolemy in 31° N. and $23^{\circ} 50'$ N., only a few miles to the S. of their true positions of $31^{\circ} 11'$ N. and $24^{\circ} 8'$ N., which shows that the latitudes of those two places were probably determined from observed altitudes of the pole, without reliance upon the estimated distance between them. Below Syene, however, towards the interior, where estimated distance must have been resorted to, the errors gradually increase, until the Coloë Palus (Dembea Lake) is made to be 24° , instead of 12° , to the S. of that place; and proceeding in the same way, why may not Ptolemy have placed the Lunæ Montes 16° or 17° too far S.? That quantity, applied as a correction to his latitude, would make it very well agree with the position of the Gamaro mountains about the sources of the Gojeb and Gibe; since if, to M. d'Abbadie's longitude of $36^{\circ} 2' 39''$ E. for the source of the latter river, we add $18^{\circ} 9' 45''$, the longitude of the island of Ferro W. of Greenwich, we have $54^{\circ} 12\frac{1}{2}'$ nearly, which falls sufficiently between $47\frac{1}{2}^{\circ}$ and $56^{\circ} 50'$, the longitudes of the western and eastern limits of the Lunæ Montes (after deducting one-sixth from 57° and 67° , the number of degrees assigned by Ptolemy to their limits, as stated above) to warrant us, when taken in conjunction with the correction which may be applied to his latitude, in deciding, so far as Ptolemy's position affords an indication rather in favour of the identity of the Lunæ Montes with the mountains of Inarya, than with any which may exist in the country of Mono Moezi.

To return to the derivation of Gebel el Qamar: it has been upon another occasion observed by Dr. Beke, that if M. d'Abbadie's derivation were correct, how could Ptolemy have derived the

* M. de la Rochette on the first Meridian of Ptolemy, in Dean Vincent's 'Commerce and Navigation of the Ancients,' vol. i. p. 567; also vol. ii. p. 612.

sense of "mountains of the moon" from the word Gamaro? This objection must imply that the Arabian geographers translated their appellation of Gebel el Qamar from the Greek; otherwise it would be a sufficient answer to allege, that there is nothing to raise even a suggestion that Ptolemy derived his sense of Moon in the name of these mountains from the word "Moezi." It cannot be categorically proved that the Arabians did not, in this as in other instances, translate from the Greeks; but various considerations may be adduced which seem to render more probable that the Greeks were indebted to the early Arabs for their geographical nomenclature of the north-eastern part of Africa, than that the nomenclature of that region transmitted to us by the Greeks was first discovered and made known to the rest of mankind by themselves.

These considerations are founded upon the fact of the Arabs having been the earliest navigators of the Red Sea and Indian Ocean—upon the extent of the intercourse which history suggests as having existed in early times between Arabia and Æthiopia—the application consequent to that intercourse of the language of the Arabs in Abessinia—the circumstances under which, upon the accession of the Ptolemies to Egypt, the immediate trade between that country and the Red Sea was acquired from the Arabs by the Greeks, and afterwards continued by them under the Roman domination of Egypt—and lastly, the channels incidental to that commerce, through which the Alexandrian geographers may be supposed to have derived their knowledge of north-eastern Africa. As these topics are of sufficient interest to bear an examination a little in detail, I shall endeavour to set out in order the observations in respect of them that have occurred to me, and thence to deduce what was the course of information to Ptolemy of the geography of that part of Africa which includes the mountains where the Nile was reputed to rise, of those mountains themselves, and of their name.

That the Arabs, Dean Vincent has observed (*Periplus*, vol. ii. p. 2), were the first navigators of the Indian Ocean, and the first carriers of Indian produce, is evident from all history, as far as history goes back; and, antecedent to history, from analogy, from necessity, and from local situation: and we may conclude that then, as now, the same circumstances threw likewise into their hands the principal trade of the Red Sea and of the coast of Africa beyond it.

Of the intercourse of the early Arabs with the interior of Abessinia, history affords but few and scanty notices; nevertheless these notices point to circumstances of a sufficiently large operation to raise the inference that that intercourse brought them acquainted with all parts of Abessinia long anterior to the era of the Greeks in Egypt.

It has been maintained by Ludolf, upon the authority of Procopius of Gaza, Stephanus, and an Arabic writer cited by him under the name of Uranius, and by Scaliger (in Dean Vincent, *Periplus*, vol. ii. p. 110), that the Abessinians are of Arabian origin, Ludolph says (*History of Æthiopia*, lib. i. c. 1) that they were formerly reckoned into the number of the Sabæans and Hamyarites, and adduces as arguments in proof of this origin the similarity of their customs and physical conformation, and the near affinity of the Æthiopic and Arabic languages, a harmony of which he has appended to his *Æthiopic Lexicon* (2nd edit. 1699). Dean Vincent, on the other hand (vol. ii. p. 107, *et seq.*), finds ground, in the account given by Herodotus (lib. 2, c. 30) of the defection of the 240,000 Egyptians, who quitted the government of Psammeticus and migrated into a country 57 days' march beyond Meroë, for supposing the Abessinians to be of Egyptian origin. But this conclusion of Dean Vincent is somewhat overborne by the subsequent testimony of Herodotus himself, in the 104th chapter of the same book, where he alludes to both the Egyptians and Æthiopians as having existed from time immemorial. Dean Vincent considers the mixture of Arabic in the language of the Abessinians to be accounted for from their constant communication with Arabia in the earliest ages; and still more, from the common origin of language in Egypt and the adjoining countries.

Without venturing to determine whether or not the Abessinians were descended from Sabæan tribes, who in early times migrated into Abessinia, there is reason to conclude that successful irruptions of the Sabæans into that country at some remote period took place. Pococke (*Specimen Historiæ Arabum*, edit. 1806, p. 60) cites, on the authority of Abu-l-Feda, El Jannabi, and Ahmed-ibn-Yusuf, the eighteenth king of Yemen after Kahtan (Joctan of the Scriptures), by name Afrikús, as having given his name to Africa; and the twenty-third king, by name Nashero-l-Ne'am, and the successor to Balkis, alleged to have been the Queen of Sheba who visited Solomon, and who is in like manner mentioned by M. Marcel,* on the authority of the Arabian geographer, Noury-el-Baqúi, as having made considerable conquests westward in Africa. El Baquí is also stated by M. Marcel to add, that the Sabæan dominion embraced Egypt and the adjacent countries, and that the people of Nubia had in his time, which was about the year 1400 A.D., resident at Dongolah, a king said by them to be descended from the ancient Hamyarites; and Bruce, whose account is confirmed by MM. d'Arnaud and Thibout (*Bulletin de la Société Geogr.*, Nov. 1842, p. 381, and Feb. 1843, p. 93),

* 'Mémoire sur les inscriptions, &c. dans la description de l'Égypte,' vol. xv. p. 14. Edit. 8vo.

observed traces of the Sabæan worship of the moon among the Shillooks and Dinkas, on the banks of the White Nile, not far above its junction with the Abessinian Nile, so late as the last century. Concurrent with the testimony of the Arabian historians we have that of Herodotus, who states (lib. ii. c. 100 et 140) that Egypt was twice ruled by Æthiopian kings; firstly, by eighteen, in the period of the three hundred and thirty generations which prevailed between Menes and Mæris; and secondly, in which he is more particularly confirmed by Diodorus Siculus (lib. i. c. 65), by an Æthiopian king of the name of Sabakos, who governed the country for fifty years and then retired again into Æthiopia. Sabakos, however, according to the collation of Berosus in Josephus (lib. xl. c. 1), was only the first of three Æthiopian kings who ruled over Egypt during forty years of the period assigned by Herodotus and Diodorus to Sabakos alone. Of this last Æthiopian rule we have the further particular from Herodotus of its having been the second in order before that of Sethon, with whom Herodotus states (l. ii. c. 141) Sennacherib made war, which would make Sethon the same with Tirhakah the Æthiopian, mentioned in the 2nd Book of Kings (c. 19), and by Isaiah (c. 37), and the æra of Sennacherib, which was from 713 to 712 B.C., coincident with part of the reign of Sethon. Sethon was preceded by Anysis, who had been previously dispossessed of the kingdom by the Æthiopians, and could not, upon his restoration, therefore, after the long interval of the Æthiopian dominion, have reigned more than a few years: consequently either Anysis or Sabakos, or the last of the two successors of Sabakos, if there were three Æthiopian kings, must have been the same with the King of Egypt mentioned in the 2nd Book of Kings (c. 17) as So, who conspired with Hosea, king of Israel, against Shalmaneser, the predecessor of Sennacherib in Assyria, about the year 722 B.C.; and the second Æthiopian reign in Egypt would date from about the year 770 or 760 B.C. to the year 720 B.C. This date, then, is too much posterior to that of the kings of Yemen, stated to have invaded Æthiopia, to admit of any supposition of identity between them and the Æthiopians of the second Æthiopian dynasty in Egypt; and as there is no mention of later conquests by the Sabæans in Æthiopia, we must recur to earlier events in Egypt, on which, faint as the light of history falls, it yet affords some gleams by which we may venture to discern the presence, in Æthiopia, Nubia, and Egypt, of a king of Yemen.

It has been stated that Nashero-l-Ne'am, the twenty-third king of Yemen, succeeded the Queen Balkis, alleged to have reigned over Yemen in the time of Solomon, who ruled over Israel and Judah from the year 1015 B.C. to the year 976 B.C. This date, if we allow for the duration of the reigns of Queen

Balkis and of Nashero-l-Ne'am sixty years, which may be done without violence to probability, would place the termination of the reign of Nashero-l-Ne'am in the year 916 B.C., which would very well reconcile his conquest of Æthiopia and Egypt with the era of Zerah the Æthiopian, mentioned in the 2nd Book of Chronicles (c. xiv.) as having gone up against Asa, King of Judah, by whom he was vanquished and pursued to Gerar, in the direct road from Judæa to Egypt, about the year 922 B.C.

It must be acknowledged that the above coincidence does not harmonize with the subsequent series of rulers of Egypt given by Herodotus, but it is not on that account the less a coincidence as between the records of Scripture and those of Arabian history; and it receives additional support from the fact of the early invasions of Egypt referred to having been from the side of Æthiopia; for, in the absence of all historic notice of invasions of Egypt from any other quarter by early Arab tribes, it would necessarily follow, if the Sabæans extended their irruptions as far as Egypt, that they must have come through Æthiopia, which, again, they could only have accomplished by first securing for themselves a passage through Abessinia. There is, therefore (however little we may be able to define particular events), some concurrent historical evidence in favour of the general conclusion to be drawn from the Arabian writers, that the Sabæans did at one time invade and conquer Abessinia and the adjoining countries.

Ludolf's arguments, from the affinity of the language and customs of the Arabians and Æthiopians, for a common origin of the two people, may admit of qualification to the extent of supposing that affinity to be due to the dominion only of the Arabs over the whole or greater part of Abessinia in an early age. But beyond that, historical experience, from the very ground which he takes, does not warrant a rejection of his hypothesis. It is not merely the oral but literary, form of the Æthiopic which corresponds so closely with the ancient Arabic; the characters, even, in which the Æthiopic is written being, as observed by Mr. Bird in his description of some Hamyaric inscriptions found at Aden and Sana (Journal, Bombay Branch, Royal Asiatic Society, October, 1844), almost similar to those of the Hamyaric writing.

If we were to recur to Dean Vincent's suggestion of the common origin of language in Egypt and the adjacent countries for an explanation of the close affinity subsisting between the Arabic and Æthiopic, we might suppose that a still closer affinity would be discoverable between the Æthiopic and the languages spoken by the descendants of Cush, who peopled, besides Africa, Assyria, Mesopotamia, and Judæa; but whatever may have been the characteristics of the language originally spoken in Æthiopia, Ludolf expressly states (lib. i. c. 15) that the affinity between

the existing Æthiopic and the Chaldee, Syriac, and Hebrew, is remote, as compared with the closeness of its affinity to the Arabic.

Nor is Dean Vincent's argument of mere voluntary intercourse, if it is to be so understood, between the Æthiopians and Arabians sufficient wholly to account for the similarity of their languages. An intercourse between races of the same stock, such as existed between the descendants of Joktan and Peleg, of Isaac and Ishmael, may furnish cause for lingual congruity, as of the Arabic with the Hebrew; but it may be suggested whether it would not be as reasonable to attribute the prevalence of Celtic in some of the languages of Western Europe to other than causes of former irruptions of the Celts into the districts where it is found to prevail, as to assume that the influence of Arabic upon the language of Æthiopia has not been the result of circumstances of conquest.

We are, therefore, if the above statements and arguments be consistent, justified, as well from incidents of language and of custom as of history, in supposing that the early Arabs of Yemen did, shortly after the time of Solomon, possess in dominion Abessinia. To what extent their conquests stretched cannot be known; but Ludolph, in enumerating the minor kingdoms formerly belonging to Abessinia (lib. i. c. 3), and therefore of people formerly under the same national influences, includes among them Inarya and Kaffa. Of these minor kingdoms, Inarya and Kaffa, and all others to the south of the Blue Nile, have been long since overrun by invading Galla tribes, whose language has kept pace with the progress of their encroachments.

In order to judge how far the assumed use of the language spoken by the Sabæan Arabs will account for the occurrence, from their time, of the particular word *Qamar* in the name of the mountains where the White Nile rises, it will be necessary to trace that word in connection with the general progress of the Arabic language.

Arabic historians (M. Marcel, *Mémoire*, &c., p. 142; Pococke, &c., p. 155) inform us that the ancient language of Arabia was divided into two principal dialects, which took their names from the two most considerable tribes by which they were used; the one was called, from the tribe of Hamyar, the Hamyaric dialect; and the other, from the tribe of Qoreish, the Qoreishite dialect.

The Hamyaric dialect, supposed to be by far the most ancient, was spoken by the tribes of Yemen descended from Joctan. As a distinct dialect, it has been superseded since the time of Mahomed, by the Qoreishite, and we only recognise some of its peculiarities through notices by more modern authors of words formerly belonging to it.

The Qoreishite dialect was common to the tribes descended from Ishmael, settled in the Hejaz to the N. of Yemen. It was considered to be the more pure dialect. The Koran was written in it; and it has thence become the current language wherever Arabic is spoken.

Although the two dialects have been described by Arabian writers as possessing idioms and terms peculiar to each, we do not find their difference asserted to be so great as to preclude their being considered to constitute, in their fundamental principles of construction and affinity, one language. Those writers themselves, in tracing the derivation and signification of obsolete Hamyaric words, frequently recur to the Qoreishite dialect for an explanation of their etymology (notes *passim* in Pococke); and Pococke adduces, as explanatory of the general character of the Hamyaric, that it approached more nearly to the Hebrew, Syriac, or Chaldee (p. 157), while it is well known that the Qoreishite, as it has descended to us in the later Arabic, is likewise cognate with the same tongues. That many words and phrases should have prevailed in one part of Arabia which were not recognisable by the inhabitants of another part, is not surprising, when we reflect upon how multiplied must have been the sources of vocables to a language which has accumulated (Pococke, &c. p. 158) two hundred synonyms for the name of a serpent, five hundred for that of a lion, eight hundred of honey, and in which one thousand yet leave unenumerated expressions for a sword. But notwithstanding this immense variety of terms, every word in sound and structure conforms to the law of a single language, and evinces thereby that it has been, wherever locally originated, produced in affiliation to a pre-existing parent stock.

However certain it may be that some words of equivalent meaning in the two dialects differed, it is equally certain that others were common to both, and from the nature of language this last class of words would include more generally the names of objects, of which the distinctive qualities known to the speaker were fewest in suggesting attributive synonyms. Such objects would be the heavenly bodies, and those large and individual appearances in nature which great divisions of the human race have been found by common consent, as it were, to designate through succeeding ages by the same specific names. Of the latter kind of such objects, again, mountains, rivers, individual localities, as cities, tracts, and countries, furnish examples; and of the former kind the name of the "sun," which there is every reason to conclude was "Shums" from time immemorial throughout Arabia; since the N.E. peak of the central ridge, about 1600 feet high, of the peninsula of Aden, the sea-port of Saba, the ancient capital of the tribe of Hamyar, who worshipped the sun

(Pococke, &c. p. 5), is still called "Gebel Shumsan," or "mountain of the sun," marking thereby the Sabæan use of the word "Shums." In Hebrew and Syriac the sun is likewise expressed by "Shums."

Although the worship of the heavenly bodies was very general in Arabia (Sale, *Koran*, Preliminary Discourse, p. 17, ed. 1734), and even spread thence to Samaria in the time of Hosea (2 Kings, c. 17), but few of their Sabæan names have been transmitted to us, and of these the name of the moon is unfortunately not of the number. It is only, therefore, by inference, on the principle above ventured to be set forth, that we can assume the principal name for the moon to have been constant with the whole of the Arabs. That name, as it relates to the subject of this inquiry, would be *Qamar*, which is the word used repeatedly to designate the moon in the *Koran*, now written more than twelve hundred years ago. As used in the *Koran*, written also for wide circulation, the word *Qamar* must have been then well established; and of a word of this peculiar kind found in the *Koran*, it may fairly be asked, what may not be supposed to have been its previous antiquity? The learned Sale has said (Preliminary Discourse, p. 25) that "the Arabic language is undoubtedly one of the most ancient in the world."

Why the Arabs, upon their first acquaintance with Æthiopian topography, should have applied this specific name to the mountains where the Nile was reputed to rise, can only at this distance of time be matter of conjecture; but that conjecture stands in juxtaposition with other circumstances, which impart to it as much of consistency as is necessary for the present argument.

That conjecture is, either that the Arabs supplanted the original Æthiopic name of these mountains by one derived from a Sabæan source, and that the present local words *Gamaro* or *Gimiro* are but corruptions of the Sabæan appellative *Qamar*, or if *Gamaro* or *Gimiro* be regarded as the original Æthiopic name of the mountains, that the appellative *Qamar*, from the consonance of its radical letters with those of *Gamaro* or *Gimiro*, may have been applied as an equivalent, and become generally substituted for those words among all traders, to whom Arabic, as the language of commerce of those parts, was known.

In support of the first hypothesis it is to be noted, that from the moon constituting an object of Sabæan worship (Pococke, p. 5), it is as probable that mountains should have been named after it as after the sun, an instance of which has been already given. Accordingly, the *Gebel el Qamar* of Africa are not the only mountains known to the Arabs by the name of *Qamar*. In *Hadhramôt*, a province of Arabia to the N.E. of Yemen, between the towns of *Sherma* and *Merbath*, is a mountain named

Gebel el Qamar (D'Herbelot, Bib. Orient. in v. Comar), and the cape at the southern extremity of the peninsula of India, called by Europeans "Cormorin," is likewise named by the Arabs Qamar or Qomr (*idem* in v. Comar). It would, therefore, not be surprising if the early Arabs had applied a similar designation to African mountains.

In support of the second hypothesis, it is a curious coincidence that a chief signification given by Ludolf (Lexicon, &c.) of the Æthiopic word Qamre (spelt with qof, mai, rees) is fornix, camera; and by Castell (Lexicon Heptaglotton), fornicis instar ædificatum; and that a further signification by Ludolf, from the use of the same word in a book called 'Magic Prayers,' is "Sphæræ planetarum, in specie lunæ." The only word approaching Qamar in the Coptic is Gom or Jom (spelt with gangia, ou, mi) signifying (Peyron, Lexicon) vis, robur, potentia, which is in affinity with the idea of the mass and firmness of a mountain, as fornix, &c. is with the form of it. There are, therefore, some slight grounds for assuming that Qamre may have been an original term in some Æthiopic dialect to express the idea of mountain, or that it may have been an original Æthiopic designation for the mountainous tract which now bears the name of Gamaro or Gimiro; and it cannot be unreasonable to assume, that the early Arabs might have converted those words into their own homonymous word Qamar, or Qomr, or Qomri, while we find so respectable modern an authority as Malte Brun (Geogr. vol. ii. p. 215, Engl. ed.) talking of a high country in Yemen named "Gebel," and our navigators converting "Ras el Fil," meaning "Cape Elephant," and the same with the Mons Elephas of Ptolemy (lib. iv. c. vii.), into "Cape Felix" (Horsburg, Directory, &c., vol. i. p. 227, ed. 1826).

So far, then, the early intercourse of the Arabs with Abessinia has been regarded as sufficient to account for their knowledge and designation of the Abessinian Mountains of the Moon. Their subsequent intercourse with that country and with Egypt during the time of the Ptolemies and the Romans, and the derivation from them, in that period, of the sense of Mountains of the Moon, to the Greek geographers, is now to be considered.

After the accession of the Ptolemies to Egypt, the importance of the trade in the Red Sea soon began to attract their attention. Ptolemy Philadelphus, the second of the dynasty, founded at the head of the Heroopolitan Gulf the city of Arsinoë, which offered to the maritime trade on the east of Egypt a dépôt at the shortest possible distance from Alexandria, the great emporium of its Mediterranean commerce on the west; and finding afterwards that the north winds, which blow down the Red Sea for nine months in the year, opposed a dangerous obstacle to the

passage of merchandise in ships in its upper course, he built, to obviate that difficulty, and possibly at the same time to leave Palestine and Syria less independent of a traffic through Egypt, on the African shore, 400 miles to the south of Arsinoë, the port of Berenike, where the cargoes were unladen from the ships, and forwarded in twelve days by land to Coptos, in Lower Egypt; and then, again, with the view of still further benefiting the trade, he established the second port of Berenike, called also Ptolemais Theron, 350 miles (Capt. Moresby's Chart of the Red Sea) to the south of the first Berenike, and on the site, probably, where the Æthiopian traders had been accustomed to resort to meet the vessels from Arabia, when the trade came to Egypt through this part of Æthiopia (Pliny, in Sharpe's History of the Ptolemies, p. 73).

But it was in the succeeding reign of Ptolemy Euergetes, which commenced about 246 years before the birth of Christ, that the more extensive commerce of the Red Sea became appropriated by the Greeks. Towards the end of his reign Ptolemy Euergetes undertook an expedition to Adulis, the modern Maszawwah, whence he pushed his conquests along both shores of the Red Sea and on the African side, subjugated the sea-port states as far as Zingebare, and the countries inland as far as Shawa, a province to the south-east of the first Nile. The record of this expedition was preserved in the Adulitic inscription discovered by Cosmas in the year 525 of our æra, and 750 years after the visit of Ptolemy to Adulis (Cosmas, *Topographia Christiana*, in Dean Vincent, &c., vol. ii. p. 531 *et seq.*).

Although the more extended trade in the Red Sea must, pursuant to the measures of the first three Ptolemies, have passed to the Greeks, the local trade from port to port, and between Arabia and Africa, must still have remained, as it always has, with the Arabs, whose local situation and habits of life have ever qualified them, better than strangers, for intercourse with each other and with the adjacent tribes of Africa.

From similar circumstances in respect of the Abessinians and those with whom they traded inland, it may be affirmed that the Greeks did not participate in their inland trade between their southern provinces and the sea-coasts of the Red Sea and Gulf of Aden, which was most probably then carried on, as in the time of Cosmas (*idem* in Dean Vincent, &c., vol. ii. p. 541), and as at this day, by themselves.

Thus may it be presumed that the Greeks under the Ptolemies obtained no larger share in the commerce of the Red Sea than has fallen to the lot of others who have since commanded its navigation. The trade from distant places, as it affected Egypt, was in the hands of the Greeks. The local trade, between the neigh-

bouring ports of Arabia, and of Arabia and Africa, and the internal trade of Abessinia, was with the Arabs and Abessinians.

As the Greeks only entered into a navigation in the Red Sea already well established by the Arabs, they would naturally have derived their first knowledge of its incidental geography through Arabian information and an Arabian nomenclature; and whatever names had been applied to places in and about the Red Sea, by the Arabs, would come down to the Greeks with the Arabian stamp upon them unaltered.

There is no ground even for inferring that they could have acquired any knowledge of Abessinia, particularly of its southern provinces, except through the route of the Red Sea. The same natural difficulties which now preclude caravans from travelling from the countries about the sources of the Nile into Egypt, by land, must have operated with equal force, so long as nature has maintained in those parts the same aspect; and from the commencement of commerce, all information of the provinces of Abessinia would have travelled, first, from those provinces to the sea-coast, and thence, by the prevailing route of trade, into Egypt.

When the Romans succeeded the Ptolemies in Egypt, the trade in the Red Sea would still have maintained the same comparative relations, and the knowledge of the adjacent countries in Africa to the geographers of the Roman æra, would be but the progressive advancement of that already acquired by their predecessors under the Ptolemies.

Under the Roman dominion of Egypt, in the reigns of the Emperors Adrian and Antoninus, in the second century of the Christian era, lived Ptolemy the geographer. That he did not visit the places which he describes, to the south of Meroë, is to be inferred from his errors of latitude; it being not too much to affirm that the altitude of the pole, by which his observed latitudes were measured, might have been ascertained by mere mechanical contrivance within the reach of any ingenious mind, with more precision than his results evince. His knowledge, therefore, of the geography, with its nomenclature, of north-eastern Africa would have been derived through the works of preceding writers, and the common channel of information on the subject, to him and them, which the trade in the Red Sea, it has been shown, had so long kept open. This nomenclature, then, would have likewise reached him, as it was known to its first discoverers the Arabs, and, so far as it originated with them, would have been in terms of their language; and if they had already adopted for the mountains, where the Nile was reputed by them to rise, the name of Gebel el Qamar, the sense of these words would have been known to the Greeks through their communication with the Arabs, and have been rendered by the equivalent expression in Greek of *Σελήνης Όρος*.

Of what high antiquity are the names of many places in Arabia and the opposite part of Africa, may be seen by comparing the existing names of provinces and towns and tribes with those given in the earliest writings. In the Adulitic inscription, for instance, are mentioned, in Africa, Agame, Ava, Ath-Ágau (the Agows, near the sources of the Blue Nile), Saméné (Samen), Zaa (Shawa), At-Almo (Lam-Almon), Zingabéné (Zingebar), with others identified by Dean Vincent (vol. ii. p. 544 *et seq.*) from the names of the same places given by Bruce; in Arabia also Sabea. The name of the town of Aden in Arabia has existed from time immemorial; and the Arabian province of Hadharmôt still bears the name of the son of Joctan (Gen. xi.); the province of Irak, that by which it was designated in the time of Nimrod (Gen. x.), and the Arabian name of Egypt, "Misr," has been transmitted to us from that of Mizraim, the son of Ham (*idem*). Why then should it be assumed on any one ground that the "Gebel el Qamar," or "Mountains of the Moon," were not known to the Arabs long before they were heard of by the Greeks? Every presumption is against such a conclusion. The early history of the Arabs—their enterprising spirit—their prior navigation of the Red Sea—the extended use of their language—mark them to have been the first instructors of the Greeks in the geography of the regions on the shores of the Red Sea without the bounds of ancient Egypt.

The above considerations have been offered at length, because they involve, together with the early knowledge of a particular place to the Greeks, the origin of their acquaintance with the geography of a great part of Arabia and of north-eastern Africa. The priority claimed for the Arabs in these respects appears even in their name "Níl," for the Nile itself in its passage through Egypt; and a short digression to show the probability of their having derived that name from a source anterior in date to the use of the Greek word Νεῖλος or the Latin Nilus, may not be deemed too irrelevant for admission. Abd el Latýf (p. 191, White's ed.), who wrote his book on Egypt at the close of the twelfth century, and after him, Ferozabádi, who died in 1414 A.D., states that the word Níl as an appellative for the river Nile is derived from the verb Nál, to bestow, to give, which with kesra under the nun in place of futha, and a yé in place of the alef, becomes the name of that which is given. According to Eratosthenes (in Jablonski, Pantheon Ægyptiorum, pars ii. p. 159) and Diodorus Siculus (lib. i. c. 63) the Νεῖλος was originally called Αἰγυπτος, and obtained its name of Νεῖλος after an early king of Egypt, who "greatly distinguished himself by constructing beneficial works in connection with the river," from which it would follow that the Greeks adopted their term of Νεῖλος from an Egyptian word. Jablonski (pars ii. p. 156) thinks that the name of the Nile is

derived from two Coptic words signifying "certo et determinato tempore adscendens." In some places in Scripture (2nd book of Kings, c. 24, v. 7, &c.) the Nile is denoted by the Hebrew word *Nehhl*, meaning primarily a narrow valley containing a stream, particularly which at certain periods overflows (Dr. Lee's Hebrew Lexicon; M. Marcel, *Mémoire sur le Meqias*, &c., *Description de l'Egypte*, vol. xv. p. 41), and having nearly a similar signification through the sister-dialects of the Chaldaic, Syriac, Samaritan, and Persian. Dr. Lee makes the Hebrew *Nehhl* cognate with the Arabic *Nahl*, which signifies a first draught with which camels, &c. are watered; but there is also an Arabic word *Nehhl*, signifying to bestow, and nearly synonymous with *Nál*. In all these words, and in the corresponding word in Æthiopic also, according to M. Marcel, there is a sufficient concurrence of the same radical letters, to render it extremely probable that some form of the present word *Níl* has been a name for the Nile with the Arabs from the commencement of their language, and that it is an offspring from an eastern root whence the name of the King *Νεῖλος* was also derived.

Whilst finally concluding these philological remarks, I would suggest whether the signification of the words *Mono Moezi* has any relation to the sense of *Moon*, and whether some clue to their meaning may not be deduced from the Coptic words *Moone* or *Mono*, signifying (Peyron, *Lexicon*) *mansio*, *habitatio*, also *portus*; and *mes gignere*, whence *mese generatus*, and *mesi*, *masi*, *pullus*. It is just possible that the compound *Mono Moezi* might imply people of the Port (of the lake *Zambezi*). M. Jomard (*Voyage à Tembaktú par René Caillié*, vol. iii. p. 525) suggests that the word *Tembaktú* includes the Berber article *ta*, which appears to resemble the feminine Coptic article τ . It is, however, a subject not yet at all investigated how far the Æthiopic, Coptic, and Arabic may have entered into the general basis of African languages.

It now remains to submit a few reasons in connection with physical geography which have induced me to think that M. d'Abbadie is right in his conclusion that the White Nile rises in *Inarya*, and this I desire to do, it must be remembered, in reference only to the general ground on which I have essayed to put the question, in stating it to be one of whether the waters and consequently main sources of the White Nile are derived from *Inarya* and *Kaffa*, or whether the rivers formed by the waters of those districts are to be looked upon as tributary only, and secondary to the main stream of the White Nile, of which the principal origin is to be sought for to the south of the 2nd degree of south latitude.

If we regard, relatively, for the present purpose, the configura-

tion of Africa, we find that on the N.E. the Red Sea constitutes an axis of depression, on either side of which continuous mountain ranges have been thrown up parallel to its coasts; the one, on the E., in Arabia; the other, on the W., in Africa. The African range separates the valley of the Nile from the Red Sea, and is in no place broken down so as to admit of the passage of the waters of the Nile into the Red Sea. Towards the lower part of the Red Sea, and afterwards in the Gulf of Aden, where the shores of Africa and Arabia gradually recede from each other, until the easternmost point of Africa is attained and the shore of that continent turns abruptly round to the S. and W., the altitude of the mountains on either side rapidly increases, as if the forces which upheaved them, then becoming divergent, had also acted with more marked and distinct effect. On the Arabian side the range which there separates the Tehama, or low tract bordering the sea, from the upper country, cannot, as far as my observations at a distance enabled me to judge, be less than 5000 feet high. But notwithstanding that height, and that this part of Arabia is within the influence of the S.W. monsoon (Niebuhr, *Description de l'Arabie*, p. 3), no rain falls in the Tehama at the period of that monsoon, and the rain which then falls in the upper country is too scanty to suffice even for purposes of cultivation (*idem*, *Voyage*, vol. i. p. 300). On the African coast also, within the Red Sea, no rain falls at the time of the S.W. monsoon to the eastward of the African range (Bruce, *Travels*, &c. vol. iii. p. 65, 4to. edit.); while to the westward of the same range the S.W. monsoon prevails, with greater or less intensity, from the Indian Ocean to Nubia, being more regular over Abessinia and the mountainous regions to the south (Bruce, vol. iii., Ritter, vol. i. p. 222, and *Meteorological Tables*, vol. iv. p. 663), and interrupted in Darfour in long. $28^{\circ} 8' E.$ and lat. $14^{\circ} 11' N.$, and in the districts W. of the White Nile (Browne, *Travels*, &c. pp. 234-254, and *Meteorological Tables*, p. 475). On the coast of Africa outside the Red Sea, in the Gulf of Aden, so much rain falls at the period of the S.W. monsoon as to prevent the passage of Kafilahs from the interior, and to cause the traders frequenting the entrepôt of Berberah then to disperse and seek a drier asylum till the return of fine weather in October, which rain is probably owing to the contiguity of that tract to the high southern part of the Abessinian plateau and Indian Ocean, and also to its own hilly nature.

Now, since the S.W. monsoon along the African coast takes a direction from S.S.W. to S. (oral information from Capt. Moorsby, late superintendent of the survey of the Red Sea), and the high mountains of the Abessinian plateau, including Kaffa and Inarya, intercept the rain of the S.W. monsoon in what would otherwise be its passage across them to the mountains of Yemen, in

Arabia, it is clear that if there were any other mountains on the south side of the mountains of the Abessinian plateau higher than or even as high as themselves, the rain of the S.W. monsoon would in like manner never reach them, or at most reach them with its force much modified; but the contrary of each of these conclusions is the fact: wherefore it follows that the Abessinian plateau constitutes the highest land in Africa within the influence of the S.W. monsoon; and it would be just, on this ground alone, to infer that the large tributaries to the White Nile, which are known to flow from the southern part of the Abessinian plateau, where its mountains are by positive testimony likewise highest, are the true sources of the main stream.

If we are to concede, with M. d'Arnaud that the Saubat, joining the White Nile from the E. in $9^{\circ} 17' N.$ and $29^{\circ} 7' E.$, brings nearly half the volume of waters to its stream; the Misselad, joining it from the W. in $9^{\circ} 11' N.$ and $30^{\circ} 34' E.$, a large volume of water; and the Shooa-berri, coming from Inarya, a considerable portion likewise; there would not appear to be a sufficient volume of water left to be accounted for to raise the presumption that the main stream can yet come from the S. The Shooa-berri itself, in the map which accompanies M. d'Arnaud's paper, is made to be the upper course of the White Nile.

Assuming, however, that the main stream of the White Nile does come from a part of Africa near its eastern coast, to the S. of the 2nd degree of S. latitude, let us see what are the concurrent circumstances involved in such an assumption.

The mouths of Damietta and Rosetta of the Nile are in $31\frac{1}{2}^{\circ}$ of N. lat., and, supposing its source to be one degree and a half to the S. of $2^{\circ} S.$, the course of the river, in latitude alone, would extend over 35 degrees; and, allowing for variation of longitude and tortuousness of the stream, its actual course would not be less than a distance equivalent to 45 degrees of latitude, that is, than 2700 geographical miles.

No sufficient estimate of the elevation of the source of a river can be deduced from the inclination of its bed, as measured between any two or more points in its lower course, in consequence of that inclination increasing in an irregular, though generally accelerated ratio, as the source is approached; but by confining such a calculation within the limits of observed data, we may obtain a result for the elevation of its source, than which the true elevation cannot be less.

Keeping this principle in view, we have, in the case of the White Nile, the following data from which to calculate the inclination for the first half of its course, of its bed, and approximate elevation of its source.

In the delta, between the Mediterranean and Kahireh, a dis-

tance by the Rosetta branch of about 120,000 toises, equivalent to 234,000 mètres, or rather more than 2 geographical degrees, the inclination of the stream will of course vary with the height at Kahireh of the surface of the river, which ranges from 13.246 mètres (= 43.458 ft. Eng.) on occasions of high Nile, to about 5 mètres (= 16.404 ft. Eng.) when the flood has subsided, above the level of the sea in the Mediterranean (M. G. Le Père, *Observations sur le Profil de Nivellement de la Vallée du Nil*; Description, &c., tome xviii. 2^e partie, p. 88), and may be taken at the latter period, when the height of the water is stationary at its minimum, at about 2 inches (= 2.13155 ins. Eng.) in 1000 toises (= 76735 ins. Eng.), equal to $\frac{1}{39000}$ (M. Le Père aîné, *Mém. sur la Vallée du Nil*, &c., tome xviii. 1^e partie, p. 566).

According to the observation of M. Caillaud (*Voyage à Méroë*, vol. iv. p. 74), the mean altitude of the mercury in the barometer at Assouan, on the mornings of the 23rd and 24th of November was 755 millimètres (= 29.725 ins. Eng.) at a temperature of 62°·6 Fahr., and the mean morning altitude for the 9th of November at Kahireh (M. Coutelle, *Observations Météorologiques*; Description, &c., tome xix., p. 454) is 763.6 millimètres (= 30.0537 ins. Eng.) at 59°·45 Fahr., which would make Assouan about 95.705 mètres (= 313.86 ft. Eng.) above Kahireh. The distance between the two places by the river, measured on the large French map, is about 200 leagues, equal to 8 geographical degrees or 888,889 mètres. The inclination, therefore, of the river between them will be expressed by $\frac{95.705}{888889} = \frac{1}{9287}$ or in even numbers by $\frac{1}{9000}$.

The next place, of the altitude of which we have any distinct notice, is Senaar, on the Blue Nile, about 120 miles above its junction with the White, and situated in 13° 37' N., and being 10° 27½' to the S. of Assouan, and, by the course of the river, about 13½ degrees, equal to 1,500,000 mètres, distant from it. Bruce assigns to the plateau of Senaar an altitude of 4000 feet, equal to 1220 mètres above the sea, in which he is supported by the opinions of Rennell and Humboldt (Ritter, *Geogr.*, vol. ii. p. 251). Then since the stream of the White Nile was found upon examination by M. Caillaud to be much more rapid than the stream of the Blue Nile, and its volume of water half as large again (vol. ii. p. 201), we are justified in assuming that the point in the White Nile corresponding, in distance from the junction, to Senaar on the Blue, will be at least as high as Senaar, that is, 1220 mètres above the sea. If from this quantity we deduct 110 mètres for the altitude of Assouan above the sea, there will remain 1110 mètres for the rise of the bed of the White Nile in the 13½ degrees, or 1,500,000 mètres, of its course next above Assouan, which will give a rate of inclination of $\frac{1}{1360}$; and, supposing only

this rate of inclination to be continued for the remaining $21\frac{1}{2}$ degrees, equal to 2,388,891 mètres, of the river's assumed course, the further elevation attained through that space would be 1756 mètres, equal to 5760 feet English; to which if 4000 feet, the altitude of Senaar, be added, the result of 9760 feet would express the elevation of the source of the White Nile above the sea. That such an amount of elevation is within the truth we have the corroborative fact by Bruce that the source of the lesser river, the Blue Nile, is from 9000 to 10,000 feet above the sea.

Before proceeding to make further use of this result, however, in order to meet any objection which may be urged of the altitude of 4000 feet for Senaar, and for the corresponding point on the White Nile, being too great, let us take this altitude at one-half only, or 2000 feet, equal to 610 mètres, from which, if the 110 mètres for the altitude of Assouan be deducted, there will remain 500 mètres, and the inclination of the river will become $\frac{1}{3000}$, which inclination, we will suppose, as before, not to be exceeded in the remaining $21\frac{1}{2}$ degrees, or 238,891 mètres, of the course; we shall then have an altitude through that space of $\frac{238891}{3000} = 796\frac{1}{3}$ mètres, or 2612 feet English; to which if the assumed altitude for the point corresponding to Senaar, of 2000 feet, be added, we shall have for the elevation of the sources of the White Nile above the sea 4612 feet. But as the primary streams constituting the sources run in valleys, and are, by hypothesis, supposed to collect a considerable drainage within the tropics, they must be accompanied by mountains of additional height above them; and we may fairly assume, from the foregoing data, the general height of the mountains where the Nile rises to be not less than 6500 feet above the sea.

That tropical mountains of such an altitude, when exposed to the moist winds from seaward, are sufficient to cause in abundance the periodical rain incidental to mountainous regions within the tropics, is, I think, proved by the occurrence, during the S.W. monsoon, of heavy rains on the west coast of India, where the Syhadree range, running parallel to the coast, and not on an average more than 5000 feet high, has been known to produce on its immediate ridge 280 inches of rain in the year.* Consequently it would follow, if the upper course of the Nile took a direction, as Dr. Beke would maintain, to the country of Mono Moezi, situate to the S. of the line, near the E. coast of Africa, that the mountains about its source would produce heavy and continued falls of rain as the sun became vertical to them, which would cause an accession of waters to the Nile at some time between the autumnal and vernal equi-

* This result was indicated by a rain-gauge kept upon the Mahabuleshwar range, and was communicated to the author on the spot.

noxes. But we know that such is not the case, since the Nile does not begin to rise in Egypt till the end of June, which is about six weeks after the regular setting in of the rains in Abessinia. If the White Nile received an accession of waters shortly before or at the time of the vernal equinox, a rise in the river at Kahireh might be expected in May. But so rare are the instances when a rise of the Nile has been observed at Kahireh in May, that its occurrence is regarded as a phenomenon (M. Jomard, *Bulletin de la Société Géographique*, Feb. 1844, note, p. 138), and may be accounted for on the supposition that the light showers which prevail in Abessinia through February, March, and April have been heavier than usual.

According to Bruce (vol. iii. p. 745, *et seq.*, ed. 4to.), the aggregate quantity of rain falling at Gondar, during the three last-mentioned months, or rather during February and March, for scarcely one-tenth of an inch falls in April, does not exceed one inch; and it would appear to be brought to Abessinia by a continuation of the north-eastern monsoon (Horsburg, *Directory*, &c., vol. i. pp. iv., 125, 251, ed. 1826), which takes a direction from the Indian Ocean towards this part of the continent of Africa during the southern declination of the sun. The E.S.E. winds which prevail till March off the E. coast of Africa, may also contribute to the same result. If these spring rains in Abessinia are heavier than usual, they may produce a premature rise of the Nile, as was observed at Kahireh in 1843, when a small increase of the waters occurred as early as February, and again in May and June (M. Jomard, *Bulletin de la Société Géographique*, February, 1844, p. 138). Had this increase been due to the periodical rains falling to the S. of the equinoctial line, the effect upon the river would have been more regular, and of perennial occurrence; whereas the irregularity which characterised the premature rise in 1843, is just what might have been expected to result from the irregular rain which prevails in Abessinia in the spring of the year, having fallen at intervals more plentifully than usual.

The preceding arguments, from meteorological and hydrographical data, to show the probability of the White Nile being wholly confined to the N. of the line, and being mainly dependent upon the southern regions of the Abessinian plateau for its waters, have been adduced as aids, in the absence of that certain knowledge of the physical configuration of the country which would enable us to dispense with them. Such knowledge as we have of this configuration I shall now examine, and it will be found, as far as it goes, to conduce to the same conclusion.

In a former paragraph I traced the range on the N.E. side of Africa to the neighbourhood of the Gulf of Aden, where its elevation was said greatly to have increased. This increase is concur-

rent with the increase of elevation of the whole southern part of the Abessinian plateau, of which the range in question constitutes the boundary towards the sea-coast, With that boundary it turns round to the S. After thus turning to the S. it throws out considerable sub-ranges, which extend quite to the water's edge, where they terminate in a succession of precipices for some degrees southward from Cape Gardafoon. From the southern part of the Abessinian plateau the range would still appear to be continued southerly, though at a greater distance from the eastern coast, and so as to cause the rivers on the one side to flow into the Indian Ocean, and those on the other into the Atlantic. Thus, on the eastern side of this anticlinal ridge, to name the principal rivers, we have the Wābe, the Gibe (of the E. coast), the Qelemānsi, and the Cuama, or Zambezi, and, on the western, the Zaire, the Coanga, the Cuánene, &c. If our glance be now extended to the whole river-system of Africa, it will be perceived that the great drainage of the continent is towards the Atlantic and Mediterranean. The rivers which fall into the Atlantic, it is not necessary for our present purpose to notice. But the drainage which finds an outlet by the Nile to the Mediterranean would appear to be of that large region which lies to the E. of the high land continued southerly from the eastern flank of the Atlas, until it finds a connection through the interior of the continent, by the W. of Borgou and Darfour (Ritter, Geogr. &c., vol. ii. p. 251), with the secondary ranges running out to the W. from some point in the range above described to be parallel to the eastern coast.

That a range running E. and W., near the eastern coast, does exist, we have the concurrent opinions of all geographers from the time of Ptolemy to the present day. The question is, how is it connected with the range which sends its waters to the eastern coast? In 1613 the Jesuit missionary, Antonio Fernandez (Ritter, Geogr. &c., vol. i. p. 256), when proceeding on his way from Gondar to the eastern coast, on a mission from the king Segued of Abessinia to Pope Paul V. and Philip III. of Spain and Portugal, came to the northern mountains of Inarya in 8 days after crossing the Blue Nile, and, after traversing Inarya for 11 days, descended a high mountain and reached the Gibe, which falls into the Indian Ocean. The second mountain was undoubtedly part of the range which separates the rivers of the Indian Ocean from the waters of the White Nile.

Browne (*Travels in Africa*, p. 473) states, upon native information in Darfour, that at 10 days' journey to the S. of Abú Telfian, which in his map he places in about lat. 13° N. and long. 25° 20' E. of Greenwich, is a range of mountains running E. and W., in which the White Nile is said to rise, called Koumri, and placed in his map in about 8° N. and between

23° and 28° E. He also states that the whole country, from Abú Telfian to the Koumri range, is very mountainous.

Whether the mountains here named Koumri are in reality part of Inarya, and not sufficiently extended to the E. by Browne, there is not information to determine; but, from the general vagueness of native information in Africa, and the difficulty, if not impossibility, of accurately estimating, from the assumed direction of successive marches, the relative bearings of places several hundred miles apart, such a supposition is not inconsistent. We have, however, the evidence of Browne to a mountainous range connected with the high land to the S. of Darfour, and extending from 13° N. along the direction of the 25th meridian to 8° N., and thence turning round to the E. and stretching as far as 28° E.

M. d'Arnaud (*Bulletin de la Société Géographique*, February, 1842, p. 94) testifies that large chains of mountains close upon the White Nile on both sides, in 4° 42' 42" N. and 31° 28' E. (of Greenwich), where his expedition was stopped for want of water in the river at the season of his being there. He also states that the river still continues from that point for a further 30 leagues S., when several branches unite, the principal one of which comes from the E. There our information ends.

Upon these statements it is to be observed, that, as the Nile constitutes the principal valley of the region, which is admitted by all accounts to be very mountainous, it is probable that it is attended with a continuous system of mountains in its whole course through this region; and, that were there an opening through these mountains to the S., or were the Koumri mountains of Browne reflected at their eastern extremity into a southern course so as to become connected with the range of the eastern coast to the southward of the line, the magnitude of the tributary stream to the White Nile, to which the eastern slope of the continuation of the Koumri and the western slope of the coast range would give rise, would be such as not to have left M. d'Arnaud uninformed of its relative importance; whereas the effect of the information which he acquired proved, in his opinion, that the main stream came from the E.

The range from Abú Telfian may possibly trend irregularly round to the E. until its continuation is confounded with the western of the chains through which the river passes in 4° 42' 42" N. (*Bulletin, &c.*, February, 1843, pp. 94, 96), and, having so become identical with that chain, may thence follow the outer tributaries of the White Nile until it unites with the range crossed by Fernandez, which forms the extreme southern ridge of the Abessinian plateau, and separates the waters of the White Nile from those which fall into the eastern ocean. The mountainous chain on the E. bank of the river, in the same latitude, may also be an offshoot

system from the western part of the northern crest of Inarya, which separates the waters of the Blue from those of the White Nile.

I have now given the reasons which have occurred to me for concluding, with M. d'Abbadie, that the White Nile owes its sources to Inarya and Kaffa rather than to a region S. of the equinoctial line. They are of course speculative to the extent that our knowledge of the facts connected with the geography of the White Nile is uncertain. Various, indeed, have been the aspects which this geography has been made to assume. The course of the White Nile stretched by Pomponius Mela and Pliny through the medium of the Niger to the very back of the Atlas, was by Ptolemy brought within more eastern and definite limits. By D'Anville, after a lapse of 16 centuries, the limits assigned by Ptolemy were again curtailed. By Browne and by Rennell a yet more distinct course was proposed: and while the latest writers, including MM. Jomard, D'Avezac, and Ritter, who, with Africa, have made the Nile their peculiar study, discover their opinions to be shaken on the side of the W., they withhold a precise destination for them towards the E.; thinking, perhaps, with the caution which so many changes have suggested, that the question for its final solution awaits the fuller research which shall fill up the gap subsisting between the observations of M. d'Abbadie and the termination of the journey of M. d'Arnaud.

[*The following Note is inserted for the purpose of correcting some inaccuracies in the Papers by the Messrs. Gregory and Lieut. Helpman.—Ed.*]

NOTE on the identity of certain rivers and hills on the west coast of Australia, between the parallels of 28° and 30° south latitude, which have been differently laid down by Capts. King, Grey, Stokes; Lieuts. Roe and Helpman, and the Messrs. Gregory.

THE names and positions of Mount Fairfax and Wizard Hill of Capt. King, admit of no change.

The names of Mount Fairfax, Wizard Hill, and Mount Hill were misapplied by Capt. Grey, who travelled over many hills of very similar appearance. Capt. Stokes and Lieut. Helpman have, by sea and land, cleared up this discrepancy very satisfactorily.

Capt. Grey's names of the rivers admit of no change, as he was the discoverer of the whole of those that flow into the sea between the above attitudes; his distances, only, require correction.

Capt. Grey was shipwrecked in Gantheaume Bay in April, 1839,—he and his party travelled thence to Perth by land, and he named every river which he crossed, and the description which he has given of each is so clear, that no difficulty exists in identifying the whole of them with the more recent accounts of Stokes, Roe, Helpman, and the Gregorys.

The difficulties and privations which Capt. Grey had to overcome (which will be seen by all who read his very interesting narrative) prevented his obtaining latitudes at the various rivers which he crossed, so that the map of his route, which was laid down by himself, from Gantheaume Bay to Water Peak, is too long by 14' or 15', and thence to Perth is too short the same number of miles; all, however, that is required is a simple correction of distances.

In proceeding towards the south from Gantheaume Bay, the first river, the latitude of which Lieut. Roe has very recently observed, is the Hutt, which he finds 7' farther north than laid down by Captain Grey by estimation. The next river is the Bowes, the latitude of which has been observed both by Capt. Stokes and Lieut. Roe, and found to be 11' or 12' farther north than it is laid down by Capt. Grey by estimation; thence the error slightly increases till about the Irwin river and Water Peak, where the error is the greatest, viz., 14½' or 15'.

Thus the Hutt is 7' too far south in Capt. Grey's map.

The Bowes is	11' or 12'	, ,
The Buller is	13'	, ,
The Greenough is	13'	, ,
The Irwin is	14½'	, ,
Water Peak is	14½'	, ,
The Arrowsmith is	14'	, ,
Small stream of Grey is	13'	, ,

The names and identity of the hills and rivers are as under—

Names given by Capt. King.

Mount Fairfax of King, Stokes, and Helpman	Wizard Hill of Grey.
Wizard Hill of King, Stokes, and Helpman	Mount Hill of Grey.

Names given by Capt. Grey.

The Hutt River of Grey	is	The Hutt River of Roe.
The Bowes River of Grey	, ,	The Bowes of Stokes, Roe, and Gregory.
The Buller River of Grey	, ,	Stream without name in Gregory.
The Chapman River of Grey	, ,	The Chapman of Stokes, and stream of Gregory.
The Stream similar to those to the North of Grey	, ,	The Buller of Gregory.
The Greenough River of Grey	, ,	The Greenough of Stokes, and the Chapman of Helpman and Gregory.
The Irwin River of Grey	, ,	The Greenough of Helpman and Gregory.
Water Peak of Grey	, ,	The Mount Hill of Helpman and Gregory.
The Arrowsmith River of Grey	, ,	The Irwin of Helpman and Gregory.
The small stream south of the Arrowsmith of Grey	, ,	The Arrowsmith of Gregory.

The Messrs. Gregory have sought to identify the rivers and hills of Capt. Grey by latitude only, which in the present instance is untenable, as Capt. Grey had no observations for latitude.

To show that the Arrowsmith of Grey is not to be mistaken with his Irwin, or with any other river on that part of the coast, in size, fertility, &c., it only remains to quote Capt. Grey's own description, which is this:—

“The Arrowsmith is in a rich, flat, fertile valley; it is a very large river; its bed is 200 yards wide, and 50 to 60 feet deep; the trunks of

immense trees, washed down in the floods, lie scattered on the ground about its banks; no water in the river where we crossed, without digging a few inches in the sand—large pools immediately above and below us. It drains extensive valleys running north and south between the interior range and the sandy limestone range parallel to the coast—it probably comes through the range; its mean course from the interior appeared to be from E.S.E.; many natives came to drink at it. From a range $1\frac{1}{2}$ mile south of the river is a fine view of the rich valleys which this important river drains.”

The misapplication by Messrs. Gregory of the name of Irwin to this river, is the cause of all the other misapplications of names to the northward, as far as the Bowes

J. A.

VIII.—*Depression of the Dead Sea and of the Jordan Valley.*

By Dr. EDWARD ROBINSON, of New York.

[Read November 22, 1847.]

THE deep depression of the Dead Sea below the Mediterranean appears never to have been suspected, down to the time of its actual discovery; and no experiments were ever made to ascertain the true level until March, 1837. At that time Messrs. Moore and Beek, in attempting to survey the Dead Sea, were led to examine the question of its comparative elevation by means of some experiments on the boiling point of water. They were greatly surprised at the results, which indicated a depression of about 500 English feet.* A month later, in April of the same year, Schubert's observations with the barometer gave the depression at about 600 (598·5) Paris feet.†

In the following year, 1838, two barometrical measurements were taken. That of Bertou, a French traveller, gave to the sea a depression of 406 metres, or 1332 feet English.‡ The other, by Russegger, a German, indicated 1319 Paris feet, equal to 1400 feet English.§

The results of similar barometrical measurements for the level of the lakes of Tiberias and the Hûleh, by Schubert and Bertou, exhibited a still greater diversity. The former made the depression of the first lake to be 535 Paris feet, only 65 feet less than his estimate of that of the Dead Sea; yet he made the Jordan at the bridge, near the Hûleh, to be 350 Paris feet *above* the Mediterranean—a difference of 880 French feet in the distance of about 5 miles! || Bertou, on the other hand, gave the depression of the Lake of Tiberias at 230·3 metres, or 756 feet English, being 577 feet less than his estimate of that of the Dead Sea; while that of the Hûleh, according to him, is about 18 feet; implying a fall of 737 feet in the same 5 miles ¶

Such was the state of the question when the 'Biblical Researches in Palestine' were published, in 1841. The preceding results were so greatly at variance as to be utterly inconsistent with each other; and seemed in some respects to be equally so

* Journ. of R. Geog. Soc. 1837, p. 456; *Ib.* 1839, p. lxiv.

† Schubert's Reise, iii. p. 87. The proportion of the French foot to the English is as 16 to 15.

‡ Bulletin de la Soc. de Géog., Oct. 1839, p. 161.

§ Berghaus, Annalen, Feb. u. März, 1839, p. 432.

|| Schubert's Reise, iii. pp. 231, 259. The distance is here reckoned from the bridge to the alluvial tract below.

¶ Bulletin de la Soc. de Géog., Oct. 1839, pp. 161, 146, 145.

with the rapidity of the stream and the nature of the country. I therefore ventured in that work to suggest that "so great is the uncertainty of all such partial measurements and observations (as evinced in the like case of the Caspian Sea), that the question can never be solved with exactness until the intervening country shall have been surveyed and the relative level of the two seas trigonometrically ascertained." * Such a measurement was afterwards understood to have been accomplished during that very year, 1841, by Lieut. Symonds, of the British Royal Engineers. A very slight notice of his results was laid before the Royal Geographical Society of London, at their meeting, January 24th, 1842.† One of the earliest accounts was published in this country in July, 1842, in the following extract of a letter from the Rev. Eli Smith to the writer, dated at Beirût, February 7th, 1842:‡—

"I am happy to inform you that the altitude [depression] of the Dead Sea has been ascertained by exact trigonometrical measurement. Lieut. Symonds, of the British Royal Engineers, surveyed the greater part of Judea and the region around the plain of Esdraelon; and, while doing it, carried a double line of altitudes from the sea at Yâfa to Neby Samivîl, and thence another double line to the Dead Sea. He found the latter to be 1337 feet below the Mediterranean. By similar observations he ascertained the Lake of Tiberias to be 84 feet below the Mediterranean. These numbers he gave me himself, and at the same time showed me his calculations." The same statement of the ascertained depression of the two lakes (1337 feet and 84 feet) was communicated by M. von Wildenbruch, the Prussian Consul-General at Beirût, to the Royal Geographical Society of Berlin, during the same year, and published by them in their Monthly Report.§

In May of the same year, 1842, the President of the Royal Geographical Society of London, William R. Hamilton, Esq., in his annual address delivered before the Society, and afterwards published in their Journal,|| entered into some details respecting the manner in which the survey had been performed, to which we shall have occasion hereafter to recur. He also stated the results at 1311·9 English feet for the depression of the Dead Sea, and 328 feet for that of the Lake of Tiberias. The same distinguished gentleman, in his annual address of the following year (1843), and also in his address on delivering one of the gold medals of the Society to Lieut. Symonds, gives

* Bibl. Res. ii. p. 222.

† Lond. Athenæum, Jan. 29, 1842.

‡ Bibl. Repository, June, 1842; also in Biblioth. Sac., Feb. 1843, p. 16.

§ Monatsbericht der Ges. für Erdk. zu Berlin, Jahrg. iv. p. 141, Nov. 1842.

|| Journ. of the R. Geog. Soc., 1842, pp. lx. lxi.

the exact numbers at 1312·2 feet for the Dead Sea and 328·1 feet for the upper lake.* In commenting upon this difference of level between the two lakes, he makes the following remarks, which are worthy of grave consideration:†—

“It cannot have escaped your notice that there still remains to be executed in this part of the globe a very important and interesting operation, to account for the very great discrepancy of these figures: for it follows from these two ascertained levels that there is a difference of nearly 1000 feet between the Lake of Tiberias and the Dead Sea, a distance in direct line of little more than one degree of latitude, which implies (the Jordan not being a meandering stream) a fall of more than 16 feet in every mile of its course. This is in itself a very remarkable phenomenon, and calls for the early attention of travellers and geographers. The river has been frequently crossed, and is always noted as a rapid stream; but no cataracts or decided *rapids*, as such, have been observed; and no one has traced its banks from one of these points to the other.”

It is the purpose of the present paper to draw attention to what Mr. Hamilton so justly calls “a very remarkable phenomenon;” and, by a reference to the ascertained fall of several other rivers in different parts of the globe, to present this phenomenon in its true light and proportions. The way will then be open to bring forward some considerations which may seem to connect themselves with the result.

The immediate banks of the Jordan, as is said above, have never been fully traced between the two lakes, though travellers have passed along the whole length of the valley. Bertou, in 1837, went from Tiberias to Jericho through the valley; and in 1844 the Rev. Eli Smith passed up from Jericho as far as to Wady-el-Fâri'a, N. of the mountain called Kûrn-es-Sûrtûbeh. A copy of his unpublished Journal is now in my hands. The river has been frequently crossed at various points; and, indeed, from the Lake of Tiberias as far down as to Beisân, may be regarded as well known. Irby and Mangles crossed near that lake, and again further down on the route from Om Keis to Beisân; and both they and Bertou describe the river as “winding extremely” and having little current.‡ Buckingham relates that in crossing the river 4 or 5 miles S. of the lake the water was so deep that the horses had to swim for a few minutes, the current here “winding slowly over a sandy and pebbly bed at the rate of 1½ mile an hour.”§

* Journ. of the R. Geog. Soc., 1843, pp. xi. lxxiv.

† Ibid. p. lxxiv.

‡ Irby and Mangles, *Travels*, Lond., 1845, p. 91; *Bulletin de la Soc. de Géog.*, Sept. Oct. 1839, p. 150.

§ *Travels among the Arab Tribes*, 4to. p. 7.

Just below Beisân is a ford, where Burckhardt crossed in July, and found the water 3 feet deep. He says the river is fordable in many places in summer; but during the rainy season, the spots where it may be forded are few.* Irby and Mangles, crossing at the same ford on the 12th of March, remark that the water reached above the bellies of the horses; and that the current was here much swifter than in the part nearer the Lake of Tiberias.† The same travellers a fortnight later, March 29th, in passing from Es-Salt to Nâbulus, lost their way, and coming to the Jordan, were surprised to find it very much swollen. The stream was exceedingly rapid, and so deep that they were obliged to swim their horses.‡ Buckingham, crossing with Mr. Bankes some distance above Jericho early in February, found the river easily fordable; the stream was exceedingly rapid, flowing over a bed of pebbles.§ The bathing-places of the pilgrims opposite Jericho have been often described; and the river there runs with a swift strong current, but without rapids. The same is true of the crossing-place visited by my own party further down, where I have described the Jordan as having "a still though very rapid current;" so that our Egyptian servant, a stout swimmer of the Nile, was carried down several yards in crossing. The water was here said to be 10 or 12 feet deep, and the river is never passed at this point without swimming the horses.||

These notices all indicate a swift current of the river below Beisân; but still nothing in the nature of *rapids*. It must also be borne in mind, that the fording-places are always the shallowest spots, where the current of course is the swiftest. Nor do the Arabs know of any rapids; nor have they ever reported any to travellers. It is, however, barely possible that something of the kind may exist in that singular tract of the valley opposite to Kûrn-es-Sûrtûbeh. From the foot of that mountain a higher desert tract of land, or low ridge, extends across the valley; through which the Jordan finds its way in a deep ravine. Indeed, in the vicinity of the river the whole tract is broken up into a labyrinth of like ravines, with barren, chalky sides, forming a most wild and desolate scene. Burckhardt speaks of the same as "a chain of low calcareous rocky heights."¶ This portion of the river's course has never been minutely examined; though it is obvious that if rapids exist even here, they can have no very unusual fall.

The flow of the Jordan is swift, deep, and silent; its waters

* Trav. in Syria, &c., p. 344. † Trav., Lond. 1845, p. 92. ‡ Ibid. p. 99.

§ Trav. in Palest., 8vo. ii. pp. 92, 93.

|| Bibl. Res. in Palest., ii. p. 256.

¶ Rev. E. Smith, MS. Journ.; Burck., Syr., p. 347.

emit no sound—neither roar nor murmur. Below Beisân its course has few, if any, windings. The direct distance between the two lakes may be taken at one degree of latitude, or 60 geographical miles; it being actually a little less according to the best maps. The difference of level between the lakes, as ascertained by Lieut. Symonds, is 984 English feet; giving, therefore, a fall of 16·4 feet in every geographical mile.

Let us now compare the known rate of descent in some other of the most rapid streams in the different parts of the world.

I. THE ORONTES.—The elevation of the lake of Antioch above the Mediterranean, as ascertained by the English engineers during Colonel Chesney's expedition, is 365 English feet.* This lake lies opposite the elbow of the Orontes, where that river turns S.W.; and the outlet of the lake enters the latter; so that the level of the river at the elbow differs very little, if at all, from that of the lake. The direct course of the Orontes from its elbow to the sea is about 24 geographical miles. This gives an average fall of nearly 15 feet for every mile of the course below the bend; being nearly equal to that of the Jordan. But the stream differs greatly from the Jordan in its character. Below Antioch it passes through a mountain gorge with perpendicular walls; where the river "roars over its rocky bed" in a succession of rapids and shallows, which render it unnavigable even for steam-vessels.† Further down, in the plain towards the sea, the river is in some places fordable, but is usually crossed by a ferry, and the current is very rapid.‡

In the following notices of the Elbe, the Danube, and the Rhine, the measurements are taken from Stein's Geography, a popular German work of high authority.§

II. THE ELBE.—The elevation of this stream at its junction with the Moldau, near Melnik, in Bohemia, is 426 German feet; || at Schandau, in the Saxon Switzerland, 320 feet; at Wittenberg, 204 feet. From Melnik to Schandau the distance is about 45 geographical miles, but the river varies considerably from a direct course; from Schandau to Wittenberg the course is more direct, and is about 95 geographical miles. Hence, according to these data, above Schandau, where the

* Journ. R. Geog. Soc., 1838, p. 416.

† Irby and Mangles, p. 70; Bowring's Report on Syria, p. 49; W. M. Thompson, in *Miss. Herald*, 1841, p. 235.

‡ W. M. Thompson, *Ibid.*

§ C. G. D. Stein's *Handbuch der Geographie*; herausgeg. von F. Hörschelmann, 3 Bde. 8vo., Leipz. 1833–34, sixth edition.

|| The proportion of the German (Rhenish) foot to the English is as 139·1 to 135, or nearly as 15·5 to 15.

river breaks through the Erz mountains, the average fall in each direct geographical mile is $\frac{106}{44} = 2.3$ feet; and below Schandau, where the river is still for some distance among the mountains, only $\frac{116}{94} = 1.2$ feet. Yet the Elbe is justly regarded as a very rapid stream.

III. THE DANUBE.—It is necessary here to include only that portion of the river which flows among mountains, and is the most rapid, viz. between Passau and Vienna. The elevation of the stream at Passau is 786 German feet; at Vienna 480 feet. The direct distance is nearly 130 geographical miles. The average descent, therefore, in each mile is $\frac{306}{130} = 2.3$ feet. Yet this tract comprises the celebrated *Strudel* and other rapids, formerly so much dreaded by the boatmen. Indeed, until the introduction of steam navigation, the boats which descended the Danube were very rarely, if ever, taken back; but were broken up at the end of their voyage.

IV. THE RHINE.—This noble river we may look at in three different sections.

1. *Between Cologne and Mayence.*—Here we find the celebrated scenery of the Rhine. The river flows between mountains, and is a bold and rapid stream. The elevation at Mayence is 256 German feet; at Cologne 112 feet; the distance between the two places nearly 90 geographical miles. The average fall, therefore, is $\frac{144}{90} = 1.6$ feet in each mile. Yet in this tract is the rapid at the Lurlei, the Binge-Loch, and others; and so powerful is the current, that the steamers which descend from Mayence to Cologne in a day, for a long time took two days to return. Indeed, so late as 1827, the time of a steamer from Rotterdam to Strasburg was eight days; while the downward trip was made in forty hours.

2. *Between Mayence and Basel.*—Here the Rhine pours its waters rapidly with very many windings through the immense plain. Its elevation at Basel is 755 German feet; at Mayence, as before, 256 feet; and the direct distance between the two cities about 158 geographical miles. This gives the average descent of $\frac{499}{158} = 3.1$ feet a mile; nearly double that of the straighter and more navigable portion below. The very winding course of the river, however, serves greatly to diminish the rapidity of the current.

3. *Between Basel and the Lake of Constance.*—At Stein, situated at the foot of the lake, the elevation is 1200 German feet; at Basel, 755 feet; the direct distance between is about 56 geographical miles. The average fall is, therefore, 8 feet in each mile of direct distance. But this section of the Rhine is the most rapid in the whole course of that river, after it loses its character of a mountain torrent in the Lake of Constance.

Besides the strong rapid at Laufenburg, it includes the celebrated fall of Schaffhausen, from 75 to 80 feet in height. If these be deducted, the average fall is reduced to 6 feet in the mile. This portion of the river is not navigated except by produce boats; and these are only pushed or towed up the current by main strength.

V. THE MOHAWK.—If it should be said of the preceding streams, that the measurements depend merely on the barometer, and are therefore of doubtful accuracy; yet in the present instance such an objection cannot be taken. The great Erie Canal runs all the way along the bank of the Mohawk; and the measurements are the results of actual levellings and surveys in laying out that great work. The elevation of the river at Rome, above tide-water in the Hudson, was found to be 419 English feet.* The direct distance from Rome, along the valley of the Hudson, is not less than 95 geographical miles. This gives the average fall in each mile at $\frac{419}{95} = 4.4$ feet. The Mohawk is everywhere full of ripples and rapids; and probably every one who has seen the two rivers would regard it as a more rapid stream than the Jordan. The above measurement comprises also the falls of the Cohoes, having a descent of 70 feet; and the Little Falls, where the water descends 42 feet in half a mile. Deducting these, the average fall of the river is reduced to 3.4 feet in the mile.

VI. THE MISSOURI.—At the Great Falls of the Missouri, 2500 miles above its junction with the Mississippi, it is stated that the river descends 357 feet in 18 miles by a succession of falls; the greatest fall being 87 feet perpendicular, and the next 47 feet.† This would give the average descent in each mile not quite 20 feet.

RECAPITULATION.

	Fall per Mile.
THE JORDAN, without rapids and usually deep	16.4 feet.
THE ORONTES, "roaring over its rocky bed," with shallows	15. "
THE ELBE, above Schandau	2.3 "
" from Schandau to Wittenberg	1.2 "
THE DANUBE, above Vienna, with rapids	2.3 "
THE RHINE, lower section, with rapids	1.6 "
" middle section	3.1 "
" upper section, with falls	8. "
THE MOHAWK, with many rapids and falls	4.4 "
THE MISSOURI, at the Great Falls	20. "

Thus it appears that of all these streams the only ones, which

* N. Y. Canals: Laws and Documents, vol. i. p. 268. Albany, 1825.

† Haskell and Smith's Gazetteer, p. 416.

can be compared with the Jordan in rapidity of descent, are the Great Falls of the Missouri, and the lower part of the Orontes, which flows over rocks and is unnavigable. The Rhine, in its most rapid portion, and including the fall of Schaffhausen, has but one-half the average descent of the Jordan. The Mohawk, with its many rapids and falls, has but one-fourth part of the same descent. The Jordan, so far as known, has neither cataracts nor rapids; and its flow, though swift, is silent. Yet in the 984 feet of its descent in 60 geographical miles, *there is room for THREE CATARACTS, each equal in height to NIAGARA*, and still to leave to the river an average fall equal to the swiftest portion of the Rhine, including the cataract of Schaffhausen!

All this sufficiently attests that the descent of the Jordan, so far as ascertained, does indeed present, in the language of Mr. Hamilton, "in itself a very remarkable phenomenon." And it is hardly to the credit of the scholars and learned societies of Western Europe, to whom the Holy Land is now brought within an easy journey of a few days, that more than four years should already have been suffered to elapse since attention was thus publicly called to this important problem, without the slightest effort having been made, so far as the public are informed, to arrive at its solution.

In the absence, therefore, of all further observations, and in view of the striking anomaly thus presented by the Jordan as respects all other like rapid streams, I venture to suggest—not, certainly, in a spirit of doubt or want of confidence in the distinguished engineer, but solely in behalf of the interests of science—whether, after all, there may not be a possibility that some slight element of defect or inaccuracy may have entered into the observations or calculations, and thus have affected the correctness of the result? The question would seem to be a fair one here, between the possibility of some such error on the one side, and the probability of so immense a contrast with all similar physical phenomena, so far as known, on the other.

The following account of the manner in which the observations were made is given by the President of the Royal Geographical Society, in his annual address for 1842, and is the only one I have yet seen.* Lieut. Symonds, being furnished with an excellent seven-inch theodolite, "measured a base from the Martyrs' Tower near Ramleh, on the plain of Jaffa, on which he founded his triangulation for the south portion of his district; and, finding the instrument sufficiently nicely divided

* Journal of the Royal Geog. Society, 1842, p. lx.

in its vertical arc, he was enabled to ascertain the relative levels of his various points with great accuracy. He then worked with his triangulation towards the head of the Dead Sea, taking at every station a very accurate series of vertical angles, the mean of which he worked on, making the necessary allowances for refraction and curvature; but, owing to the want of another instrument, and a competent person to take simultaneous observations, he could not ascertain what the former was, and had to assume it at $\frac{1}{4}$ of the subtended angle from the earth's centre, which he considers to be very near the truth. Lieut. Symonds completed the levels in this manner by two different lines from Jaffa to Nebi Samuel, the highest point of the Jerusalem range, the one checking the other, and found the difference but trifling. From thence he started on the same plan to the Dead Sea, and with nearly as good success, the two levels differing from 11 to 12 feet. Owing to the unfavourable nature of the ground about Jerusalem, and the cliffs overhanging the plains of Jericho, Lieut. Symonds could not carry the two lines of level, independently of each other, to the required spot, which might have been done in spite of the natural difficulties, had he had better assistance than he could procure from Bedouins. The work occupied him nearly ten weeks, though the distance traversed was not more than 47 miles, the direct distance from Jaffa to the Dead Sea."

It appears from this statement that the observations consisted in a double series of vertical angles, connected apparently (at least sometimes) with long distances. The survey, therefore, was not carried on by the process of levelling usually employed in laying out the course of a canal or railroad. However exact, therefore, the observations may have been in themselves, yet no one probably will suppose that this method of survey would ever be adopted, or in any way relied on, in undertaking any great public work, like a railroad or canal, where the ascertaining of the true level was essential.

It appears, also, that the refraction could not be determined, but was assumed hypothetically at a certain amount in the calculations. The atmosphere in Palestine is dry and singularly transparent, so that objects situated at a great distance appear as if comparatively near at hand. It would seem not unnatural that this should have an effect upon the amount of refraction, and cause it to be different from that which exists in the more humid atmospheres of England and other countries; and this difference it might require a series of careful observations to determine accurately. Especially would it seem important to take into account the peculiar degree of refraction

near the Dead Sea and along the Jordan valley, where, from the greater depression of the surface, the atmosphere must naturally be much more dense than in any other known portion of the globe.

It would seem, further, that there existed an important discrepancy between the results of the earliest calculations and those subsequently published. In the statements reported from Beirût to this country by the Rev. Eli Smith, and to Berlin by M. von Wildenbruch, the Prussian Consul-General, and derived from Lieut. Symonds himself, the depression of the Lake of Tiberias is given at only 84 feet; while the later publication makes it 328 feet—a difference of 244 feet. This would give for the difference of the two lakes 1228 feet, and would raise the average fall of the Jordan in each mile to 20 feet. How this difference arose we are not informed; it may have been by varying some one or more of the assumed elements in the calculation.

There is another circumstance which, perhaps, is hardly of sufficient importance to be adduced here, and yet, under a certain aspect, it is not without some weight. There exists a plan of Jerusalem, published by John Weale, London, 1844, and marked as "Surveyed by Lieuts. Aldrich and Symonds, Royal Engineers." This plan differs from every other in the form and extent of the Haram area, the site of the ancient Jewish temple. The eastern side of that area, according to the independent measurement of Mr. Catherwood, of Messrs. Tipping and Wolcott, and of the Rev. Eli Smith, in 1844, is 1525 feet in length; the plan in question gives it at 1400 feet. The southern side of the same area, according to the measurements of the same gentlemen, is not less than 912 feet; while it is laid down on this plan at only 830 feet; the northern end being given at about 1060 feet. Above all, the western side of the area, instead of being marked as a straight line, as is done correctly in every plan of Jerusalem from D'Anville to Schultz, is here represented as being drawn in towards the southern end by two rectangular offsets, one of 100 feet, and the other of 130 feet. That no such offsets exist is matter of public notoriety to all who have ever visited Jerusalem; and it is difficult to understand how such a representation can ever have come to be connected with the names of scientific engineers. No doubt the matter can be, and perhaps has already been, satisfactorily explained; otherwise it is easy to perceive that it might have some bearing upon a judgment of the present question.

Taking into consideration all the circumstances thus far adduced, there certainly does seem ground sufficient for the

suggestion of a doubt, whether the problem of the depression of the Dead Sea and Jordan valley is yet fully solved. Or if a re-examination should confirm the accuracy of the former results, there still remains the "remarkable phenomenon" of the great descent of the Jordan to be investigated and explained. Either of these objects alone would be worthy the attention of European governments; combined as they are, they ought not to remain uninvestigated another year. It would be a small thing for England, or France, or Prussia, to send out an expedition for this purpose; and it may be hoped that the Geographical Societies, which adorn the capitals of those countries, will not let the matter rest until it shall be fully accomplished.

The survey ought to be conducted in the same method and with all the caution and accuracy usually required in laying out the route of a canal or railway. It might be carried across the mountain from Jaffa by Jerusalem to the north end of the Dead Sea; or, perhaps, better from Gaza by way of Beer-sheba to the Dead Sea, either opposite the long peninsula or further south. This latter course would avoid the mountains, except the descent to the Dead Sea itself. The survey ought likewise to take in the course of the Jordan between the two lakes; as also the tract between the Lake of Tiberias and the Mediterranean near Haifa. These three different routes would mutually check and prove each other.

In the same connection, it would be exceedingly desirable to extend the survey to the upper sources of the Jordan above Hasbeiya, and to include also the valley of the Būkâ'a between Lebanon and Anti-Lebanon, connecting it with the Mediterranean on the north of Lebanon, and perhaps also near Tyre, along the course of the river Litâny. There is here a remarkable configuration of the earth's surface, respecting which we have as yet no accurate knowledge.

There is here at least one interesting problem yet to be solved in determining the elevation of the Būkâ'a above the sea. From barometrical measurements taken at Ba'albek, this elevation is given by Schubert at 3572 Paris feet; by Russegger at 3496 Paris feet—equivalent in English feet to 3810 and 3729 feet respectively.* Near Ba'albek rises the Litâny, which flows south and west to the Mediterranean near Tyre. Just north of Ba'albek is the low watershed in the valley, beyond which are the sources of the Orontes, which runs north to the parallel of Antioch, and then bends round south-westwards to the sea. We have already seen that the

* Schubert's *Reise*, iii. p. 322; Russegger's *Reise*, i. p. 702.

average fall of this stream below its elbow is 15 feet in the geographical mile. The elevation of its remotest source, near Lebweh, cannot vary much from that of Ba'albek, or 3729 English feet, taking the estimate of Russegger; while we have already seen the elevation at the elbow to be 365 feet. The difference gives the fall of the river between those points at 3364 feet, in the direct distance of nearly 128 geographical miles. This is equal to an average fall of 26.4 feet in each mile, or nearly double the rate of fall in the same river (15 feet) below its elbow. This result is quite incompatible with the greater comparative rapidity of the Orontes in its lower portion, and also with the general features of the country and the extensive marshes along its upper valley. The barometrical measurement of the Būkâ'a is therefore probably too high.

The same inference is confirmed by comparing the course of the Litâny. From Ba'albek to the sea its direct course is nearly 55 geographical miles. It flows at first along the alluvial valley; then breaks through the southern spurs of Lebanon by a deep chasm for about 20 miles, much of the way over a rocky bed, and with a rushing and foaming stream; and at last flows to the sea with many windings through a broad low tract of meadow land. If, now, for this 20 miles of chasm we assume an average fall in the mile of 100 feet, or 2000 feet in all (which is a very large allowance—greater, indeed, than the rate of descent at the Little Falls of the Mohawk), there yet remains of the elevation at Ba'albek (3729 English feet) no less than 1729 feet to be distributed along the rest of the course, or 35 geographical miles. This gives an average fall of very nearly 50 feet in a mile, in a course mostly along alluvial valleys. This result, therefore, goes strongly to confirm that found above in the case of the Orontes; and both together would seem to afford decisive proof that the reported elevation of the Būkâ'a must be greatly exaggerated.

Let us hope that public attention may be called to the various points referred to in this paper, and that they, who have it in their power, will speedily cause these questions to be put at rest for ever.

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IX.—*On the Fall of the Jordan, and of the Principal Rivers in the United Kingdom.* By AUGUSTUS PETERMANN, F.R.G.S.

[Read Feb. 28, 1848.]

THE depression of the Dead Sea and of the Valley of the Jordan has, ever since its discovery in 1837, excited the interest of the Royal Geographical Society of London; and recently its attention has been further invited to the subject by a very important communication from Professor Robinson of New York. In it he draws especial notice to the fall of the Jordan, which he calculates from various measurements to be at the rate of 16·4 feet per geographical mile (= 14·3 per statute mile); and he appears to regard such a fall as being "very remarkable," owing to the circumstance that no cataracts or decided rapids have hitherto been discovered to account for it. He considers such a fall without cataracts as an "unusual" phenomenon, owing to his observation of the fact that several rivers which he enumerates differ very materially from the Jordan in that respect.

In this paper it is intended to lay before the Society a few remarks on the depression of the Dead Sea and on the fall of various rivers in Great Britain, and to illustrate by well-known examples, that even if it be admitted that the Jordan falls without cataracts at the rate of 14·3 feet per mile, there is nothing very remarkable in such a fall.

The depression of the Dead Sea and Jordan valley, after repeated attempts to ascertain it by barometrical measurements since 1838, was in 1841 measured by Lieut. Symonds by trigonometrical operations, the results of which, generally speaking, are much more to be relied on than barometrical observations; yet the discrepancies between the results of the trigonometrical and the repeated barometrical measurements have called forth from different quarters the desire that the trigonometrical results should be finally re-examined by that method which, so far as regards accuracy, has the preference over both barometrical and trigonometrical measurements—namely, a series of levellings to be carried from the level of the Mediterranean to the basin of the Dead Sea.

Professor Robinson suggests two reasons for the possibility that the results of Lieut. Symonds' trigonometrical measurements cannot be considered as fully solving the problem of the depression of the Dead Sea and Jordan valley—

1st. The discrepancy of the trigonometrical and barometrical results.

2ndly. The anomaly of the descent of the Jordan, according to the trigonometrical results, when compared with the fall of other streams.

For the investigation of the first point, it will be of importance to examine all the barometrical measurements of the Dead Sea and the Lake of Tiberias, which have been made up to this time.

Professor Robinson has taken no notice whatever of the measurements of the Prussian Consul-General Herr von Wildenbruch, which were communicated to the Royal Geographical Society of Berlin in 1846, and which may claim the first place in point of accuracy amongst all barometrical measurements hitherto made, owing to the circumstance that they were checked by the simultaneous observations of a second barometer at the level of the Mediterranean.*

		Dead Sea. (Original meas.)		L. of Tiberias. (Original meas.)		Dead Sea.	L. of Tiberias.	Difference between the two Lakes.
		Fr. met.	Fr. ft.	Fr. met.	Fr. ft.	Eng. ft.	Eng. ft.	Eng. ft.
March 1838 } May 1839 }	De Berton † (Barom.)	419·0	..	230·3	..	1374·7‡	755·6	619·1
November 1838 } December 1838 }	Russegger (Barom.)	..	1341·0§	..	625·0	1429·2	666·1	763·1
1845	Von Wildenbruch (Barom.)	..	1351·6	..	793·3	1446·3	845·5	690·8
Mean —						1416·7	755·7	661·0
1841	Symonds (Trigonom.)	..	..	..	..	1312·2	328·1	984·1

However great may be the discrepancies in the preceding figures, they exhibit some analogous features which are of con-

* These observations were made by the Marquis de St. Simon, commander of the French ship of war Alcibiade, and both barometers were accurately compared. (They were made, as it appears, on board the vessel.) See Monatsberichte der Gesellschaft für Erdkunde zu Berlin, Jahrgang 1845 to 1846.

† The merit of the first actual measurement of the level of the Dead Sea is due to the Comte de Berton. Schubert was the first who took a barometer to the Holy Land, but he failed in ascertaining the depression of the Dead Sea; owing to the inefficiency of his barometer, he could only make an estimate, the result of which, about 600 French feet, or 639·5 English feet, as compared with his measurement of the Lake of Tiberias, 570·2 English feet, makes a difference between the two lakes of only about 70 feet, which, as it is so very much at variance with all other measurements, cannot be taken into account.

‡ The measurement of De Berton, as given by Robinson at 406 metres (= 1332 English feet), is only the result of a first calculation; the *ultimate* result, drawn from all his observations, both in March, 1838, and May, 1839, gives 419·0 metres (= 1374·7 English feet). See Bull. Soc. Géogr., xii., 1839, p. 166.

§ This is stated by Prof. Robinson as 1319 French feet. See Reisen, &c., 1835-1841, von J. Russegger, iii. p. 184.

siderable importance. When we compare the three barometrical results apart from Lieut. Symonds, we perceive a discrepancy, taking maximum and minimum, for the depression of the Dead Sea of 71·6 feet; and for that of the Lake of Tiberias of 179·4 feet.

These discrepancies in barometrical measurements, executed by three different parties, at different times, with different instruments, and in general under different circumstances, are not great; and in the absence of a more accurate method of measurement, one would never have hesitated to consider the mean of the three measurements as a pretty fair approximation to the truth: for the Dead Sea this mean is 1416·7 feet, and for the Lake of Tiberias = 755·7 feet; the trigonometrical results are 1312·2 and 328·1 feet.

The discrepancy for the Dead Sea will be 104·6 feet. This is not altogether unsatisfactory, and does by no means justify a doubt in the accuracy of the trigonometrical operations; there is unquestionably also much weight in Lieut. Symonds' having decidedly expressed himself as certain of the accuracy of his trigonometrical observations, the different parts of which he found agreeing with each other.*

The more unaccountable is the very great difference we observe between his results and those of the three barometrical observations for the depression of the Lake of Tiberias: it is 427·6 feet—i. e. more than four times greater than that for the Dead Sea. Symonds' operations for the Lake of Tiberias were quite independent of those for the Dead Sea; but his account of them is far less complete than for those of the latter, nor does he express his opinion about the result, as he did for that of the Dead Sea. And what is of still greater importance, there is a very considerable discrepancy between his first and subsequent calculations—the first giving only 84 feet, and the latter 328·1 feet, below the Mediterranean. On the other hand, the barometrical measurements of the Lake of Tiberias and those of the Dead Sea were not independent of each other, and were made successively at short intervals.

The results for the level of the Lake of Tiberias should therefore be considered in the same degree approximately correct as those for the Dead Sea. And on this ground the great variance of 427·6 feet between the results of Symonds and those of De Bertou, Russegger, and Von Wildenbruch, can scarcely be attributed to a *threefold error* on the part of the three last-named observers.

On this consideration I conclude that there seems to be as

* Journ. of R. Geog. Soc. 1842, p. lxi.

little ground to doubt the accuracy of Lieut. Symonds' result regarding the depression of the Dead Sea on the one hand, as on the other we have reason to suspect the correctness of his observations on the Lake of Tiberias.

Should my suggestion prove to be correct, and the level of the Lake of Tiberias be ascertained to accord more with the barometrical measurements, the descent of the Jordan will then be reduced one-third.

But previously to submitting a few remarks on the descent of the Jordan, I cannot forbear noticing an idea, which, however vague and hypothetical it may appear, might yet be a hint for future investigations, and which at any rate cannot be misplaced here, were it only to claim more of impartiality for the important labours of Lieut. Symonds. In examining the results of De Bertou, Russegger, and Von Wildenbruch, it is curious to observe, that the depression both of the Dead Sea and of the Lake of Tiberias increases in a chronological order, with the only exception of Russegger's 666·1 feet for the Lake of Tiberias.

Schubert's measurement of the Lake of Tiberias, a year previous to those enumerated in the foregoing table, confirms also that progress of increase; and likewise De Bertou's observations in 1838 give a greater figure than his first in 1837.

The degree of the increase within a period of seven or eight years, from Schubert and De Bertou to Von Wildenbruch, amounts to 71·7 feet for the Dead Sea, and 275·3 feet for the Lake of Tiberias.

To make this rate of increase the basis of a speculation on the gradual sinking of the basin of the Dead Sea, is at present out of the question; the observations we possess are too scanty. Although the phenomenon of the sinking and rising of land is a well-established fact, no one would ever suppose that so great a rate of sinking as from 71·7 feet to 275·3 feet could have passed unnoticed by the inhabitants and travellers in such a country where it occurs, but that there may be a continual change going on in the level of that basin, similar to that in the Scandinavian peninsula (or, if we take a more analogous instance, that of the Aralo-Caspian basin*)—no one would doubt, especially since it is well proved that the whole Jordan valley with its lakes not only have been, but still are, subject to volcanic action. "The bituminous and sulphureous sources of the Dead Sea," says Volney, "the lava, the pumice-stones thrown upon its banks, and the hot-baths of Tiberias, demonstrate

* Humboldt's *Central Asien*, Bd. I. pp. 522, *seq.*

that the seat of a subterraneous fire is not yet extinguished. Clouds of smoke are often discovered to rise from the lake, and new crevices to be formed on its shore." And Russegger observes that the mountains between Jerusalem and the Jordan, in the valley of the Jordan itself, and those around the Dead Sea, bear unequivocal evidence of volcanic agency, such as disruptions, upheaving, faults, &c. &c. ; proofs of which agency are still notorious in the continual earthquakes, hot-springs, and formations of asphalt.

Should the result of a measurement by levellings show only a slight difference from that of Lieut. Symonds, and favour the supposition of a sinking still taking place, the question would arise, whether to attribute it to a defect in the trigonometrical operations or to a change in the levels.

I now proceed to an examination of the fall of rivers in general, in order to show that the descent of the Jordan, which from the Lake of Tiberias to the Dead Sea amounts, according to the trigonometrical results, to 984·1 feet, does not stand in contradiction with the general facts of the physical development of rivers.

The fall of rivers.—This interesting branch of physical geography presents in its comparative results such striking anomalies as perhaps have never before been anticipated. There are rivers in this country that are of the same aggregate size and descent, and the one forms in its course a series of considerable waterfalls, the heights of some of which approach nearly to 100 feet; whilst the other, equivalent, as before mentioned, in size and fall, presents not even a single waterfall or cataract, nay, not even one decided rapid.

To ascertain the rate of fall, there are two points, the accurate knowledge of which is necessary—1st, the length of the river in question; 2nd, its elevation.

The length of the river, that is to say, the development of its course, is greatly influenced by the extent of its windings. These windings in their true extent can only be delineated with sufficient accuracy in maps of a very large scale, such as is adapted for national maps, as the windings which rivers generally exhibit disappear in reduced maps to such a degree that a great difference is produced in the calculations.

For the purpose of forming a judgment of the rate of the decrease of a river's course by constructing different maps in decreasing scales, I made the following inquiry regarding a river which is not uncommonly meandering in its course. I here allude to a portion of the Severn, from its source to Shrewsbury, and I found the following numerical results:—

	Scale.	Length. Miles.	Difference.	
			Miles.	Pr. Cent.
On the Ordnance or National Map .	1 mile to 1 inch	81·8		
Index Map of the Ordnance Map.	10 to 1	68·5	13·3	16·3
Petermann's River Map of the British Isles	25 to 1	62·5	19·3	23·6
Useful Knowledge Society Map of the British Isles	42 to 1	58·0	23·8	29·1

The first, the Ordnance Map, forms the basis of the other three. By comparing the Index Map with the Ordnance Map itself, the scale of which is ten times larger, the figures show that the windings of the river in the Index Map disappear to such a degree as to give a decrease of 13·3 miles for a length of 81·8 miles, or 16·3 per cent. ; and so a map on a scale 25 times smaller gives a decrease of 23·6 per cent., and a map on a scale 42 times smaller 29·1 per cent.—that is, measuring off the length of a river in a map of a scale of 42 miles to 1 inch, the results, however carefully measured, are nearly one-third too small.

Thus with regard to the Jordan, although not a meandering river, and forming almost a straight line from the Lake of Tiberias to the Dead Sea, yet the few bends and windings of the river, when taken into account, give it a length of 80 English miles,* which is 11 miles longer than Professor Robinson's statement of 60 geographical miles. The 14·3 feet of fall per mile which he thus calculates, will be reduced by the 80 English miles, to 12·3 feet. And I have no doubt that when the course of the Jordan is thoroughly explored, it will exhibit a still greater development, and the rate of fall will be still more reduced.†

The fall of a river influences in part the velocity or force of its current, but not to such an extent as that the rate of fall can be taken as a scale for the rate of the velocity and force of the current. We call the Danube, the Rhine, and the Elbe very rapid rivers, and they only exhibit a fall of 1 and 2 feet, and very seldom 3 feet per mile ; but we should not place the Tweed in the same rank of velocity, and yet it has an average fall of nearly 8 feet in its main course from the point of affluence of Biggar Water to the sea, which is a length of 80 miles, and with this fall is freely navigated by small boats, at least so far up as Peebles;‡ while a descent of only 2 feet in the Danube pre-

* According to Robinson's Map in his *Biblical Researches*.

† The Jordan, as appears from Lieut. Molyneux's account, is extremely winding in its course ; the American expedition under Capt. Lynch found that it serpentine 200 miles, and the fact confirms Mr. Petermann's argument.—Ed.

‡ Fullarton's *Parliamentary Gazetteer of Scotland*, ii. p. 775.

sents the greatest obstacles to navigation. Thus the mighty Amazons falls but 12 feet in the last 700 miles of its course, or one-fifth of an inch per mile; yet, from the immense volume of its waters, the collision of its current with the tide of the Atlantic is of the most tremendous description.

It is obvious from the preceding remarks, that in comparing the rate of fall of one river with another, the size, that is the depth and width, of the rivers should be taken into account.

The Jordan in point of magnitude ranks with several rivers of Great Britain. Legh compares the Jordan to the Thames below Oxford; and it appears, in collecting all the different statements for the size of the Jordan between the two lakes, that the average breadth may be considered to be about 30 yards and the depth 8 or 9 feet.* The Dee of Aberdeenshire ranks in size with the Jordan, although it is only the 29th of the British rivers in regard to the extent of its basin, and stands also far below the Jordan in this point of comparison; but this difference is balanced by the nature of the climate in which the two basins are situated. The basin of the Dee lies in a very humid region, as it drains a part of those mountainous districts of Scotland which give birth to so many perennial streams, whilst the basin of the Jordan lies in a region so arid that its tributaries are almost dried up during the summer season; and amongst those, which it does receive from the eastern water-slopes of Palestine Proper, there is not one perennial stream.

I conclude, from various measurements of the breadth and depth of the Dee, that it conveys as great a quantity of water (if not greater), to the German Ocean, as the Jordan to the Dead Sea. The mean annual breadth of the river Dee at Glenmuick parish is 70 yards, and the mean depth 4 feet; the portion of the river within this parish is 38 to 53 miles distant from its mouth; in other parts farther down the breadth is 80 yards and the depth 12 feet: thus the average breadth in its lower course, for a distance of about 50 miles, may be taken at 70 yards, and the depth from 4 to 12 feet;† and as the average size of the Jordan between the two lakes is only computed at 30 yards broad and 8 to 9 feet deep, the river Dee may fairly be ranked with the Jordan in point of magnitude.

The entire length of the Dee is 87·5 English miles, and its fall 4060 feet.‡ The greatest portion of this fall naturally belongs to the upper course, the limit of which and the middle

* Kitto's Pictorial History of Palestine. vol. ii. p. clxxiv.

† New Statistical Account of Scotland, xii. pp. 776, 832, 875.

‡ Ibid. p. 648. The Dee takes its rise high up on Mount Braeriach, the top of which is 4220 feet high; the well or fountain whence the river springs is 4060 feet, according to Dr. Skene Keith.

course may be best fixed at a distance of 15·3 miles from the source; that is, at the Linn of Dee—a spot where the river has cut through opposing rocks a long narrow passage between 30 and 40 feet deep, and forms four small waterfalls, the central one about 10 or 12 feet, the others not above half that height. Below the fall the water has scooped out a series of basins, in which it rests, deep, dark, and motionless.

From the Linn of Dee to the sea, a distance of 72·2 miles, it has yet to descend 1190 feet, which makes an average fall of 16·5 feet per mile. This is about one-fourth more than the average descent of the Jordan; and yet in the whole course of the Dee below the Linn it does not present a single waterfall or decided rapid. In some places the Dee exhibits even a fall of more than 20 feet per mile, owing to the unequal distribution of fall, to which all rivers are more or less subject, but still there are *no waterfalls* or other sudden descents.

There is another river in Scotland, the fall of which, although larger, approaches nearly to that of the Jordan. This is the famous border stream, the placid Tweed. The entire length of this river is 96·4 English miles, and the total descent is 1500 feet; thus the average fall per mile would be about 16 feet; but the actual distribution of fall for the different portions of the river is thus:—

	County.	Length.	Height.	Fall per Mile.
		Engl. M.	Engl. Ft.	Feet.
From the source	Peebles .	1,500		
To affluence of Biggar Water . . .	„	16·5	605	54·2
Altarstone	„	1·6	582	14·2
Neidpath Castle (1 mile before) Peebles).	„	8·0	518	8·0
Cardrona Mains	„	6·4	472	7·2
Boundary between the Counties of Peebles and Selkirk . . . }	„	6·3	400	11·4
Affluence of Cadon Water . . .	Selkirk .	5·0	362	7·6
Fairnielee Bridge	„	1·3	348	10·8
Affluence of Gala Water . . .	Roxburgh .	4·4	301	10·7
Affluence of Leader Water . . .	Berwick .	4·5	260	9·1
Kelso Bridge	Roxburgh .	15·4	110	9·7
The Sea	Berwick .	27·0	0	4·1
Total length and fall =		96·4	1,500	..

The affluence of Biggar Water is a very good limit between the upper and middle course of the Tweed; the distance from that point to the sea is 80 miles, which is nearly the same as the Jordan between the two lakes. We see from the preceding table that the fall of the Tweed within its middle and lower course approaches in many places very nearly to the supposed average fall of 12 feet in the Jordan, as near as 11·4 feet; and

in a short distance from Biggar Water to Altarstone the rate of fall reaches even 14·2 feet per mile; and yet from the affluence of Biggar Water to the sea the Tweed possesses neither waterfalls nor rapids; and small boats, such as are used in salmon-fishing, are freely navigated.

Thus the fall of the Jordan of 12 feet per mile, even without waterfalls, does not present such a great contrast to the falls of rivers in general, as is shown by the adduced instances.

Lieutenant Symonds' measurements may therefore prove perfectly correct; and it is not at all necessary that any falls should be discovered to account for the descent of the Jordan.

But certainly there must be something to account for the striking anomaly of Professor Robinson's results and my own. The rivers which he draws up for comparison with the Jordan exhibit more or less falls, and the two rivers which I adduce here exhibit none. One might naturally suppose that this was the consequence of incorrect data on either side, upon which our results are based; but it is not so—it is the anomaly which this feature of hydrographical development exhibits; and it is only from the deficiency of study in this branch of physical geography, or rather the scarcity of data for such a study, that this anomaly has not been fully explained.

As the velocity of rivers does not altogether depend upon the rate of their descent, in like manner the average fall does not determine the formation of cataracts. It is much more the geological character of the country through which the river runs which causes those sudden descents, and countries where sudden declivities abound are chiefly of primary or transition formation. We find striking examples in every direction.

The Severn and the Shannon, for example, are much alike in magnitude. The latter descends, from Lough Allen to its mouth, a distance of 213·8 English miles, 161 feet; the Severn, from Newtown to its mouth, a distance of 210 miles, descends 465 feet. This gives an average descent per mile of 9 inches for the Shannon, and 26·6 inches for the Severn. And yet the Severn pursues its course to the sea without any rapids or falls; whilst the Shannon, with its average fall of one-third less than the Severn, forms those magnificent Rapids of Doonas, which, for grandeur and effect, rank with the most celebrated European waterfalls.

The Tweed and the Clyde exhibit a still more remarkable anomaly. Both are very much alike in point of magnitude: the extent of their basins is 1870 English square miles for the Tweed, and 1580 for the Clyde; and they are still more alike in point of their aggregate length and fall: the length of the Tweed being 96·4 miles, and its total fall 1500 feet; the

length of the Clyde 98 miles, with 1400 feet of fall. Indeed both rivers for many miles from their source flow nearly in one direction, never diverging to any great distance from each other; and so long as they continue nearly parallel, they flow almost upon the same level, and keep on a high table-land of country, as if hesitating whether to mingle their waters or to remain separate, and whether to turn their courses to the eastern or western slope. Thus they pursue their sympathetic career till near Biggar, when they terminate their upper course, and like two wanderers descending from the mountains together, and separating by cross-roads when they have reached the low country, they at last part, the one turning eastward and the other westward. At this spot the rivers are only $6\frac{1}{2}$ miles distant from each other—are on the same level, and have the same distance to travel ere they reach the sea—yet what a difference in their descent; the Tweed pursues its course evenly and gently; while the Clyde has not parted from its former companion for a greater distance than 18 miles, before it boldly dashes over a whole series of those well-known falls, the principal of which are the Bonnington and Stonebyres Fall, and Corra Linn. The descent over all these falls is computed at 230 feet.*

Thus the preceding examples sufficiently attest that the occurrence of cataracts and other descents in a river depends but little on its aggregate fall.

Thus there is certainly “room in the Jordan for *three cataracts*, each equal in height to Niagara,” as Professor Robinson remarks; but, on the other hand, if there should not be discovered one single rapid in it, there is still nothing of a remarkable phenomenon about it.

The different points on the subject thus adduced are recapitulated as follows:—

- 1st. Lieut. Symonds’ results for the depression of the Dead Sea, compared with the different barometrical results, do not prove such an amount of discrepancy as to justify a doubt in their accuracy.
- 2nd. The same results for the Lake of Tiberias are so much at variance with the barometrical results, that it seems probable the latter would prove nearer to the true level.
- 3rd. The fall of the Jordan of 984 feet between the two lakes, as computed from the trigonometrical results, does not exhibit an “immense contrast with all similar phenomena.” And, moreover, owing to our present defective knowledge of the entire course of the Jordan, and the anomaly of the fall of rivers in general, inferences drawn from the aggregate fall of the Jordan can scarcely prove

of sufficient weight to control the results of trigonometrical operations.

I now beg leave to add a few data on the fall of some rivers in this country, selecting such as might give a view of the great variety of descents.

The British Isles afford a wide field for the study of hydrography, and I have no hesitation in saying that it possesses for that study such extensive and valuable materials and data as no other country can boast of; but, comparatively speaking, these materials have been drawn forward, sifted, and made applicable for the promotion of science to a very limited extent. For example, the country has been levelled in all directions, and especially along all rivers of note, for the purpose of laying out canals and railways, and yet we find little information in any work regarding general results of the comparative fall of rivers.

The levels in the following data are based upon authentic documents, and relate entirely to the surface of the river above the sea at low-water. The distances have been for the first time attempted to be ascertained with accuracy.

I. *The Shannon*.—This is the third largest river in the United Kingdom, in regard to its basin.* As the fall of rivers in general is greatest at their sources, and decreases proportionately towards their mouths, the Shannon in its descent presents one of the rare exceptions to the general fall of rivers, as it is greater in its lower than in its upper course. Its source, the Shannon Pot, or more generally called Legnashinna, rises in the county of Cavan, between Upper Lough Macnean and Lough Allen, and is 345 feet above the sea. After a course of 11·6 miles, it enters Lough Allen, up to which it is rendered navigable, owing to the little descent from that place. The distance to which it is navigable is 213·8 miles from its mouth; and in this respect it is superior to all other British rivers—the navigation of the Severn extending only 192, and that of the Thames 193 miles from their mouths. From the head of Lough Allen to the foot of Lough Derg, a distance of 131·8 miles, it descends only 50·5 feet, or $4\frac{1}{4}$ inches per mile. After leaving Lough Derg, the inclination of its course changes considerably, and gradually increases, till it reaches a fall of nearly 17 feet per mile between the town of Castle Connel and Castle Troy, a distance of 3·3 miles. It is in this portion where the mighty Shannon, 40 feet deep and 300 yards wide, forms the magnificent Rapids of Doonas.

* The two larger rivers are the Humber (including the Trent and the Ouse) and the Severn.

The Fall of the Shannon.

	County.	Length.	Height.	Fall per Mile.
		Engl. M.	Engl. Ft.	Feet.
From source, Legnashinna . . .	Cavan . .	..	345	..
To Lough Allen, entrance . . .	Leitrim . .	11·6	161	15·9
Lough Allen, issue . . .	..	7·0	161	..
Carrick-on-Shannon, Bridge . .	..	11·5	155	0·5
Lough Boderg and Lough Bofin, } entrance . . .	..	12·0	131	2·0
Lough Boderg and Lough Bofin, } issue . . .	..	4·7	131	..
Lough Forbes, entrance . . .	Longford . .	4·6	128	0·7
Lough Forbes, issue . . .	..	2·2	128	..
Lough Ree, entrance (at the Bridge } of Lanesborough) . . .	..	10·0	125·5	0·2
Lough Ree, issue (1·8 miles above } the Bridge of Athlone) . . .	Roscommon . .	17·5	125·5	..
Shannonbridge . . .	..	16·7	116	0·6
Lough Derg, entrance (1 mile S. } from Portumna Bridge) . . .	Tipperary . .	22·6	110·5	0·2
Lough Derg, issue (1·1 mile N. } from Bridge of Killaloe) . . .	..	23·0	110·5	..
Castle Connel . . .	Limerick . .	9·8	89·8	2·1
Castle Troy . . .	..	2·3	34·5	16·8
Limerick, Southern Bridge . . .	..	6·4	13·5	3·3
The Sea, between Loop and Kerry } Head . . .	Clare . .	62·5	0	0·2
Total length =		224·4	..	..

The Fall of the Thames.

	County.	Length.	Height.	Fall per Mile.
		Engl. M.	Engl. Ft.	Feet.
From the source, Thames Head (1½ } miles N. of Kemble) . . .	Wilts . .	..	376·3	..
To affluence of Coln (0·8 miles S.W. } of Lechlade Bridge) . . .	Gloucester . .	22·0	243·1	6·1
Tadpole Bridge, near Bampton . .	Oxford . .	10·5	219·3	2·3
Skinner's Wear (¾ mile S. from } Ensham Bridge) . . .	..	11·8	203·5	1·3
Oxford, Bridge to Botley . . .	..	7·8	190·0	1·7
Abingdon, Bridge . . .	Berks . .	9·2	168·8	2·3
Clifton Ferry . . .	..	6·5	158·0	1·7
Affluence of Kennet at Reading . .	..	25·0	119·7	1·5
Henley, Bridge . . .	..	8·1	106·0	1·7
Great Marlow, Bridge . . .	..	8·0	94·2	1·5
Windsor, Bridge . . .	..	13·7	65·6	2·1
Affluence of Coln, at Egham . .	Surrey . .	7·5	52·1	1·8
Affluence of Wey, near Wey Bridge } Teddington, first lock . . .	Middlesex . .	7·1	40·8	1·6
London, London Bridge . . .	..	13·2	21·0	1·5
The Sea at Nore Light . . .	..	17·6	4·3	0·9
	Kent . .	47·2	0	0·1
Total length and fall =		215·2	376·3	..

II. *The Thames*.—This noble river, although the most important in Great Britain in a commercial point of view, is only the fourth in point of magnitude. The entire length of its course is 215·2 miles, which is 9 miles less than the Shannon; its descent is 376·3 feet. Unlike the Shannon, it has a more equally distributed fall throughout its course; from its head to Lechlade, a distance of 22·0 miles, its fall is 6 feet; and from thence to its mouth its average fall is only 1·2 feet per mile.*

III. *The Tweed*.—We have already fully treated of this river in the foregoing observations; in point of area of its basin it ranks ninth amongst British rivers.

IV. *The Clyde*.—My results respecting the fall of this and the preceding river are almost entirely based upon levellings; the sources only of the two rivers are ascertained barometrically, and the portion of the Clyde comprising the falls has likewise not been ascertained by levelling instruments; however, that does not influence the accuracy of the general results, as the exact levels of the Clyde *above* and *below* the Falls check the intervening portion.

The Fall of the Clyde.

	County.	Length.	Height.	Fall per Mile.
		Engl. M.	Engl. Ft.	Feet.
From source	Lanark. .	..	1,400	..
To Clydesburn, near Little Clyde House	„	1·8	999	222·8
Bodsberry-side	„	3·0	872	42·3
Crawford	„	3·7	807	17·6
Affluence of Duneaton Water	„	5·0	734	14·6
Hardington Hall	„	3·7	686	13·0
Wolf Clyde, Bridge near Biggar.	„	6·0	632	9·0
Eastfield	„	8·4	605	3·2
Bonnington Fall, <i>above</i> the Fall (height of fall 30 feet)	„	10·0	1400	20·5
Corra Linn (height 84 feet), <i>above</i> the Fall	„	0·7	365	7·1
Stonebyres Fall (height 80 feet), <i>below</i> the Fall†	„	3·0	170	10·3
Redleeswood, near Daldowie House	„	20·2	46	7·6
Glasgow, Glasgow Bridge	„	(9·0)	?	?
Sea at Dumbarton	Dumbarton	23·5	0	1·4
Total length and fall =		98·0	1,400	..

* From Teddington to London Bridge it is 16 ft. 9 in. at low, and 1 ft. 6 in. at high water.

† There are two other falls of smaller dimensions, viz. the Dundaf Linn, $\frac{1}{2}$ mile below Corra Linn, 4 feet high, and one which is $\frac{1}{2}$ mile below Bonnington fall. The total descent of the river from the first to the last fall—a distance of 3·7 miles—amounts to 230 feet.

‡ The Falls excluded.

The accuracy of the data both for the Clyde and Tweed, which I ascertained from two lines of levellings quite independent of each other, are checked by a phenomenon which it might not be uninteresting to record in this place.

Both rivers are very nearly at the same level near Biggar. This very spot exhibits the remarkable phenomenon of a bifurcation of the two rivers—a bifurcation which differs from other larger (and more important) examples only so far as to depend upon the state of water in the Clyde. I give the words of the attentive angler who describes it: *—“It is a singular circumstance that salmon and their fry have occasionally been taken in the upper parts of the Clyde, above its loftiest fall, which, being 80 feet in height, it is utterly impossible for fish of any kind to surmount. The fact is accounted for in this way. After passing Tinto Hill, the bed of the Clyde approaches to a level with that of the Biggar Water, which is close at hand, and discharges itself into the Tweed. On the occasion of a large flood the two streams become connected, and the Clyde actually pours a portion of its waters into one of the tributaries of the Tweed, which is accessible to and frequented by salmon.”

V. *The Dee*.—We have already noticed at some length the fall of this river. The results for the Dee I have based upon levels ascertained by repeated barometrical measurements by Dr. Skene Keith and Dr. Dickie of Aberdeen, which have been kindly communicated to me by the latter. This gentleman also confirms my statements by his personal knowledge of the Dee—that it does not exhibit any cataract from its mouth up to the Linn.

The Fall of the Dee.

	County.	Length.	Height.	Fall per Mile.
		Engl. M.	Engl. Ft.	Feet.
From source	Aberdeen .	..	4,060	..
To affluence of Garchary	„	4·3	1,984	482·8
Affluence of Guisachan	„	3·0	1,640	114·7
Affluence of Geauly	„	5·0	1,294	69·2
Linn of Dee	„	3·0	1,190	34·7
Ballater, Bridge	„	26·4	780	15·6
Belwade, Bridge (not in maps) .	„	..	(310)	..
Banchory Tarnen (affluence of } Feugh W.)	Kincairdine	26·0	172	23·4
Drumoak	Aberdeen .	7·2	90	11·4
Affluence of Coulter Burn . . .	„	3·8	60	7·9
Sea at Aberdeen	„	8·8	0	6·8
Total length and fall =		87·5	4,060	..

* Stoddart's Angler's Companion for Scotland.

The source of the Dee, rising between Ben MacDhui on the E. and Braeriach on the W., is 4060 feet high, and most probably it is the highest source in the United Kingdom. The highest spring on Ben Nevis is only 3602 feet, according to my barometrical measurements—that is, 766 feet below the top of the hill; another spring, on one of the highest hills of the Grampians, Ben Alder, reaches a height of 3650 feet.

The Fall of the entire Jordan, according to Von Wildenbruch.

	Length.	Height.	Fall per Mile.
	Engl. M.	Eng. Feet.	Feet.
From Tell el Kady, source † . . .	..	+537·1	..
To Bahr el Hùleh,* entrance . . .	9·0	+100·0	48·6
" " issue . . .	4·0	..	..
Bridge of the Sons of Jacob . . .	2·5	+ 89·9	4·0
Lake of Tiberias, entrance . . .	8·0	— 845·5	116·9
" " issue . . .	14·0	..	..
The Dead Sea . . .	80·0	— 1446·3	7·5
Total length and fall =	117·5	1983·4	..

The spring of Tell-el-Kady forms in the preceding table the source of the Jordan; it is taken as such by the natives. The ancients give the name of the source to the spring which issues from the Cave of Panias; the latter is, however, only 2 miles longer than the former, which it receives 7 miles below its origin in the cave; there are several other streams to which the original fountain of the Jordan has been assigned—indeed its birth-place has been almost as much contested as that of Homer.

There is a considerable fall of the Jordan between the Lake Hùleh, or more correctly the Bridge of Jacob, and the Lake of Tiberias; viz., a fall of 116·9 feet per mile. This rate of fall, without cataracts, would certainly exhibit a "remarkable phenomenon;" but Von Wildenbruch expressly mentions that "from Jacob's Bridge the Jordan forms a *continuous* waterfall."

The above data are part of the results of laborious researches into the physical and statistical geography of the British Isles, which I hope ere long to lay before the public in a series of maps. However dry such tables may appear, they nevertheless form the only sound basis for the knowledge of physical geography; and it was only the want, or deficiency, of such

* I computed Bahr el Hùleh to be about 10 feet higher than Jacob's Bridge; Von Wildenbruch did not measure its level, but he says that the Jordan between the two points is almost stagnant: thus a fall of 10 feet for 2·5 miles will be fully enough. The difference between Bahr el Hùleh and the Lake of Tiberias, thus implied, agree satisfactorily with other barometrical measurements.

hydrographical facts that made us until now consider the fall of the Jordan as an unusual phenomenon.

[NOTE.—The heights for the Shannon are taken from the Ordnance Maps, except those of Castle Connell and Castle Troy, which are calculated from data given in Fraser's Handbook; those for the Thames are derived from Bradshaw's Maps of Canals of the Southern and Midland Counties, and those for the Clyde are chiefly taken from Railway Plans. For the Tweed, the height of source is determined by barometrical observation (Fullarton), and the other altitudes from Railway Plans. In the accompanying diagram I have added a section to show the whole extent of the depression of the Jordan valley. It will be observed that the southern slope is much steeper than the northern, which reaches the level of the Mediterranean at a point about 1 mile below Jacob's Bridge (101 Eng. miles from the Dead Sea), while in the Wady el Arabah the same level is attained at a distance of only about 44 miles from the Dead Sea.* Thus I compute the whole length of the depression at 190 Eng. miles—northern slope 101, Dead Sea 45, southern slope 44.]

X.—*Expedition to the Jordan and the Dead Sea.* By Lieut. MOLYNEUX, of H.M.S. Spartan.

[Read March 27, 1848.]

AFTER a very tedious passage from Beirout, Her Majesty's ship Spartan anchored off the town of Caiffa, at the southern side of the bay of Acre, and we immediately commenced putting into execution our project of carrying the ship's dingy, or smallest boat, overland to Tiberias; from thence to take her down the river Jordan to the Dead Sea; and, after a few days spent in exploring those interesting regions, to convey her back to the ship by way of Jerusalem and Jaffa. Our objects were to examine the course of the Jordan, as well as of the valley through which it runs, and specially to measure the depth of the Dead Sea. Captain Symonds, being anxious that the above views should if possible be carried out, did everything in his power to promote and further them; and as I was equally anxious to endeavour to fulfil his wishes, I was only too glad to volunteer my services for the purpose. Having therefore secured three good volunteer seamen from the ship (Grant, Lyscomb, and Winter), and having received every assistance from my messmates, by 3 P.M. on the 20th of August, 1847, all was prepared and ready for a start. We had brought Toby from Beirout to act as a dragoman, along with his two horses, tent, and canteen, which, with provisions, arms, and other requisites, were hoisted into one of the boom-boats; and at 4 P.M. we shoved off from the ship with the dingy in tow. We made sail for Acre, at the opposite side of the bay, and 2½ hours brought us under its walls, most of which have been built anew since the bombardment in 1840. We landed all the things and pitched our tent in the sand within a few yards

* Petermann's Map of Lower Egypt, Sinai, and Arabia Petrea, in Dr. Beard's 'People's Dictionary of the Bible.'

of the sea. The captain had provided me with a letter from the pasha, and another for the consul at Jerusalem; and, with the promised assistance of our worthy vice-consul, I lay down in hopes of being able to make a prosperous departure in the morning. The night was lovely, and the sea-air deliciously cool.*

Saturday, August 21st.—Mr. Finzi, the vice-consul, had provided us with four good camels for boat and baggage, and three horses for the men. After breakfast and the altercations and harangues which unavoidably attend all dealings with the Arabs, we succeeded in making a start at 9 A.M., mounted on two fine camels—having previously sent on the little boat, so that she got considerably ahead while we were employed in striking the tent. The road was remarkably good; for the first two hours a four-in-hand might have been comfortably driven along it. The plain through which it passed appeared well cultivated, being almost entirely covered with the stubble of Indian corn. At 11h. 25m. A.M. we turned aside a little to the right, to avoid a small insulated mound, at the foot of which there was a well of good water; and there we enjoyed the first growls of the Arabs in charge of the camels, for, as we came to a slight ascent, so they began to make a greater noise in proportion. The hindermost camel with the boat came to his knees, but recovered himself well. 12h. 40m. P.M., got through an awkward pass, and came in sight of the village Abilin, which we left to the right, and proceeded down the valley of Shefat 'Amar. At 2h. 30m., the same camel having again come to the ground and commenced roaring, we exchanged him for one of the others. The hills around us were covered, as is generally the case in Syria, with rocks and short stunted trees; but here and there strips were cultivated in the bottoms of the valleys; and here the road dwindled into a mere footpath. At 3h. 50m., descending from a low range of hills, we reached a well called Bir-el-Bteder, and the ruins of a khan of the same name. The soil here appeared excellent, judging from the small specimens of cultivation visible, but covered with thistles. The Nazareth road here branched off to the right, passing through the village of Sefurieh, where there appeared to be some large buildings. At 7 we reached the village of Turan, and having journeyed 10 hours almost without cessation, pitched our tent in one of the large, open threshing-floors, which appear to be the common property of the inhabitants, and are almost invariably to be met with in the neighbourhood of the villages.†

* 10 P.M., Therm. 72°.

† 11h. 50m. P.M., Therm. in tent 73°.

Sunday, 22nd.—Left our encampment at Turan at 8h. 15m. A.M., the road following the foot of the hills which bound the valley of Lubieh; the direction being about east. The sun in the early part of the day was hot, but being occasionally obscured by clouds, and tempered with a light fresh air, it was far from intolerable. At Turan, as many doves were flying about near the tent, we succeeded in bagging three of them, much to the amusement of the villagers and to the improvement of the pot. At 9h. 30m. we passed Mount Tabor, leaving it to the right, and half an hour afterwards the village of Liblieh also to the right; Mount Tabor appearing to be an insulated hill of a rounded form, something resembling an inverted basin, but of no great height. The mountains on either side of the valley of the Jordan were now visible, and the gap between them, running nearly N. and S., pointed out the direction of our future course. A portion of the land appeared to be cultivated, but the hills looked barren and arid in the extreme. Passed some very large herds of camels which were quietly grazing, the property of a Bedouin tribe in the neighbourhood.

At 11h. 30m. arrived at the top of the last ridge of hills overlooking the lake of Tiberias and the valley of the Jordan, and enjoyed a most magnificent view. Jebel Sheikh, smothered in clouds, was distinctly seen, bearing N.N.E. (by compass); before us were the blue waters of Tiberias, surrounded by fine ranges of hills; to the left the white ruins of Safed, perched on a hill; and near the northern end of the lake a gap in the mountains, with a green patch, which pointed out the spot where the Jordan discharges its waters into Tiberias, as well as the ruins of an ancient town, which stand at a short distance from its embouchure.

At 12h. 50m. a great crisis took place. We had experienced some difficulty in descending the upper part of the hills above Tiberias, but by degrees the road became so steep, that we were obliged to hold up the boat by ropes, till at length we arrived at a point beyond which the camels could not proceed, and to return was impossible; the stones, when started, rolled to the bottom; the camels began to roar; then followed the usual trembling of the legs,—the certain precursor of a fall; and, in short, to save the boat, it became necessary to cut the lashings and let her slide down on her keel to the foot of the hill. There we again harnessed the unfortunate camels, and proceeded without further mishap to Tiberias, where we arrived at 1h. 50m. P.M., and passing under the walls of the town, we pitched our tent within a few yards of

the water. Tiberias is a larger place than I had expected, and must have been tolerably well fortified.*

Monday, 23rd.—At 6h. 45m. A.M. we embarked in our little boat on the lake of Tiberias, taking with us lead, lines, &c., and everything necessary for sounding, and stood across with a light breeze till we reached, as nearly as I could judge, the centre of the lake, from whence we directed our course to its northern extremity, as I was anxious to get there in time for the sun's altitude at noon.† The observation gave us 32° 49' N. for the latitude, but it was taken about 3½' to the S. of that point. It was now so broiling hot that we landed, and remained four hours under the shade of a willow-tree, to eat and to escape from the heat of the sun. At 4 we embarked with a light breeze, which carried us over to the eastern shore, sounding occasionally until we brought Tiberias to bear W., when we stood across and reached the tent at 8 o'clock, after a very hard day's work.

Tuesday, 24th.‡—It appears to me that the lake as marked on the maps is too small, for from Tiberias to the eastern shore cannot be less than 8 or 9 miles, and from the northern entrance of the Jordan to its exit at the southern end I consider to be about 18 miles; but the high land opposite Tiberias renders its breadth very deceiving to the eye when viewed from the shore. At a quarter before 5 we left Tiberias and rode down by the ruined walls at the side of the lake. After looking at the hot-springs, the temperature of which was about 130°, I sent on the baggage, and embarking in the dingy, ran off about E.S.E. for a couple of hours, when finding, as I expected, but 13 or 14 fathoms, stood in again, and kept along the shore near the baggage. The road, however, soon left the beach, and we therefore parted company with the beasts and baggage; but Toby rode round near the water to direct us to the entrance of the river, which we found after running about a mile under some low cliffs. It lies at the western side of the low land that runs across the valley, and bounds the lake at its southern extremity. As we rounded the point at the end of the above cliffs, we turned short to the right, steering to the N. of W. for about ten or fifteen minutes, till at length the river went away S. At 7h. 20m. we had entered the Jordan, it being then dusk, but we had a fine moon; and, fifteen minutes afterwards, we landed on the right bank, at the eastern point of a little bay formed by the enlargement of the river. On the other side of the bay, and for

* 12h. 25m. P.M., Therm. in tent 82°.

† 9h. 30m. A.M., Therm. in shade 92°; 12h. 30m., in shade, Therm. 103°.

‡ 6h. A.M., Therm. in tent 82°, at noon 105°, at 5h. 30m. P.M. 105°.

some distance along the shore, there was a large Arab encampment; and we began to apprehend that we were to meet with a warm reception on our first landing on the banks of the Jordan; for, as soon as Toby had pointed out the place for us to stop, he went back to look after the baggage; and, while we landed the things out of the boat, suddenly we saw the Arabs in considerable numbers running round the head of the bay which separated their encampment from ours. Unfortunately my pistols were in my holsters with the horses, so that I was obliged to take my loaded gun and go forward to meet these unwelcome visitors. By means of signs, however, we convinced them that we only wished to sleep there for the night, and by degrees they left us. I afterwards found that they belonged to a tribe which only five days ago had been fighting with, and was worsted by the Beni-Sakhers, and were therefore obliged to take refuge on this side of the river. The next morning they again assembled round our tent, but they appeared to be friendly. I counted 90 men and boys.

Wednesday, 25th.—At 8h. 15m. A.M. we left our encampment at Kerak, sent the boat across the bay, and rode round with our baggage through the Arab tents, in order to see it clear off. Hitherto, for the short distance we had come, the river had been upwards of 100 feet broad and 4 or 5 feet deep; but the first turning after leaving the Arabs brought us to the remains of a large ruined bridge, the arches of which having all fallen down, completely obstructed the passage. Here our difficulties commenced; and for seven hours that we travelled that day, we scarcely ever had sufficient water to swim the boat for a hundred yards together. Many of the Arabs accompanied us down the banks of the river, possibly to rejoice over, or to take advantage of, any misfortune which might attend us. We afterwards passed two or three other encampments, the people of which seemed greatly surprised, and turned out to see us get the boat along, but did not offer any molestation. In many places the river is split into a number of small streams, and consequently without much water in any of them. About an hour and a half after starting we came to a full stop, and were obliged to take everything out, and carry the boat upwards of 100 yards over rocks and through thorny bushes; and in many other places afterwards it was nearly as bad. The *Ghor*, or great valley of the Jordan, is here about 8 or 9 miles broad; and this space is anything but a flat—nothing but a continuation of bare hills, with yellow dried-up weeds, which look, when distant, like corn-stubbles. These hills, however, sink into insignificance when compared to the ranges of mountains which enclose the *Ghor*, and it is therefore only

by comparison that this part of the Ghor is entitled to be called a valley.

I was surprised to find a great number of weirs running across the river; but most of them appeared to be only loose walls of stones, mud, and turf, and rising 3 or 4 feet above the water. I have seen three of them within less than a hundred yards. These weirs turn the stream into small channels, which irrigate the little green patches on either side, and produce the scanty vegetation on which the Arab flocks subsist. These weirs we found very troublesome, it being necessary to pull down a part of the wall so as to make a gap for the boat to pass; and, in some places, to avoid a row, we had to build up the gap again. At about 10h. 30m. A.M., having come to one of those weirs that was higher than the rest, and made of more solid masonry, we had to launch the boat from the top, 3 or 4 feet down into the river. These things, and the men being obliged to be constantly in the water, rendered it a matter of great difficulty to keep our arms and ammunition ready at a moment's notice, as well as to preserve some kind of communication with the cattle and baggage, which were frequently obliged to diverge to a considerable distance from the river; but a capital fellow that we hired at Tiberias as a guide, assisted us greatly in overcoming all our difficulties. At 11h. 30m. Jebel Sheikh bore N.N.E. by compass, and Jebel Ajloun S.S.E. When approaching the village of Summakh we had high, steep, sandy cliffs all along the banks of the river, particularly to the left; and the baggage animals were obliged to go along the top of these cliffs, while the boat was in the ravine below. At 12 o'clock we were nearly opposite the village of Summakh, which is perched on a round sandy hill, and looking as dry and miserable as the rest of the country. At this time I had just shot a very beautiful kind of kingfisher, and most of my other barrels had been discharged at an animal we saw on the banks of the river, which the guide called a boar, but it appeared to me more like a gigantic fox, when Toby called out to me to load my pistols—and, on looking up, I saw the camels and muleteers surrounded with a cluster of spears. I was not much surprised, for I had been expecting this for some time, and, after loading, Toby and I rode up a ravine towards the party, leaving the men to get their arms ready, and to follow if I made a sign. When I arrived on the top of the cliff, I found four Bedouins mounted and drawn up in line before the camels, and the sheikh, dismounted, standing before them. I saluted him, and told Toby to ask him what he wanted. He said that we were travelling through his country, and that it was customary for all travellers to pay

him; for without payment it was impossible for us to proceed. I explained to him the object we had in coming, and showed him how we were armed; and, after a long and angry altercation, which nearly led to blows, we made the camels and mules go down the hill to a ford, and waved to the boat to come on and join us there. The Arabs rode down the hill close to us, but did not attempt actually to lay a hand on the baggage. The sheikh insisted on being paid 600 piastres; he said his country extended 2 days' journey down the valley, and that, if I would pay him, he and his men would go with us and see us safe to the country of the next sheikh. Circumstanced as we were, it was impossible for us to protect the baggage and at the same time take the boat down the river; and as the road was too bad for the camels to carry the dingy, I saw that it was necessary, if possible, to come to some terms with these people, and therefore offered the sheikh 100 piastres to convoy us through his country and to guarantee the safety of the baggage. This proposal he treated with the most perfect contempt, and our muleteers and camel-drivers refused to proceed; but the sight of our pistols frightened them into obedience, and we went down to the village, Bedouins and all. At the village, Toby having found out that our new acquaintances belonged to the strong tribe of Beni-Sakhers, and that the valley of the Jordan was full of them, I signified to the sheikh that I would give him 200 piastres, and, if that would not do, that he might take what he could get, making at the same time a proper display of our arms. After some discussion between himself and his men, they at length agreed to the terms, and we proceeded together, along with a great number of the inhabitants of the village, who had collected around us.

We had got about $1\frac{1}{2}$ mile below the village of Abadiyeh when we saw another party of horsemen coming towards us, on which our Bedouins crossed over to the other side of the river. Soon, however, the old sheikh discovered that it was the governor of Tiberias, for whom, happily, I had the pasha's letter at hand; and, riding up, I gave it to him, followed by the Beni-Sakhers. I found that he was accompanied by a Bedouin sheikh and a few men; and, after reading the letter, he requested that I would return with him to the village of Abadiyeh, when he would give me a letter to the sheikh of the next tribe, and send also the sheikh who had arrived with himself. We repaired accordingly to a house in the village; and when his secretary had finished the letter, we departed in company with our new sheikh; the boat in the mean time having gone on in charge of the other chief.

After proceeding a short distance we came to the ruined village of El Buk'ah, where I determined to stop for the night, as we had all been hard worked throughout the day. At this place we found the ruins of two villages on each side of the river, but nothing more remaining than bare broken-down walls. We pitched our tent on the western side of the river, after hauling the boat up on the bank. Just above this place there was a small waterfall, down which we had been obliged to ease the boat. The Bedouins stuck their spears in the ground around us, and, making their halters fast, asked us for food; but, as we had none to give them, four of the party started off in different directions to procure some.

I was much interested during the night in observing the extraordinary sagacity of the Arab mares, which are indeed beautiful creatures. The old sheikh lay down to sleep with his mare tied close to him, and twice during the evening she gave him notice of the approach of footsteps, by walking round and round, and when that did not awaken him she put her head down and neighed. The first party she notified were some stray camels, and the second some of our own party returning. The Beni-Sakhers generally ride with a halter only, except when they apprehend danger; and then, the moment they take their bridles from their saddle-bow, the mares turn their heads round and open their mouths to receive the bit. I have seen this myself frequently.

Thursday, 26th.—The river appeared to be so difficult for some distance below where we encamped, and it injured the boat so much getting her over the rocks and stones, that I determined to try her on the camels, although they were but small; and after some difficulty we succeeded in fixing her. Mr. Smith and I rode down the right bank of the river with the mules and baggage, and the rest of the party went down the left bank with the camels. From a hill over which our road lay I had a very fine view of the whole valley, with its many Arab encampments, all made of the common coarse black camel-hair cloth. Very large herds of camels were to be seen in every direction, stalking about upon the apparently barren hills in search of food. The Jordan had split into two streams of about equal size shortly after leaving El Buk'ah; and its winding course, which was marked by luxuriant vegetation, looked like a gigantic serpent twisting down the valley. After forming an island of an oval form and about five or six miles in circumference, the two branches of the Jordan again unite immediately above an old curiously formed bridge, marked in the map as Jisr Mejamia. This bridge, which is still in such good preservation that the road passes over it, is

of one large pointed arch in the centre, with two smaller ones on either side, and over the latter there are three or four small arches of the same shape, which go quite through the masonry. On the western bank, opposite the end of the bridge, there is a large ruined building, of a square form, and not less than 200 feet each way; it had been well built, and even now has the remains of a fine massive gateway, composed of very large stones and looking somewhat Egyptian. The walls of this quadrangle were high and loop-holed, and had several well-built towers, some of which had windows, and in the centre stood a large cistern. The sheikh told me that this building is called Khan Alessar. Having arrived at this place with the baggage, before the camels and boat, I had time to examine the building, and also the bridge, on which I found long flat steps about 10 inches in height; and the whole built of a very dark stone, abutting against the solid rock.

The camels could not cross the river with the boat; we therefore put her on the water; and afterwards found the river so much improved that we put the spars on one of the camels, and the boat again went quietly down the stream.

The country along the banks of the Jordan appeared to be very populous; and I became convinced that it would have been utterly impossible to have succeeded, circumstanced as we were, in getting the boat down in opposition to the Arabs. The ghor or valley now began to bear a much better and more fertile aspect. It appears to be composed of two different platforms; the upper one on either side projects from the foot of the hills, which form the great valley, and is tolerably level, but barren and uncultivated. It then falls away in the form of rounded sand-hills, or whitish perpendicular cliffs, varying from 150 to 200 feet in height, to the lower plain, which should more properly be called the valley of the Jordan. The river here and there washes the foot of the cliffs which enclose this smaller valley, but generally it winds in the most tortuous manner between them. In many places these cliffs are like walls, and entirely precluded the possibility of communication between the river and our cattle above. About this part of the Jordan the lower plain might be perhaps $1\frac{1}{2}$ or 2 miles broad, and so full of the most rank and luxuriant vegetation, like a jungle, that in a few spots only can anything approach its banks. Some of the bushes and ferns are very beautiful, particularly a feathery-leaved tree (something like the cedar of Lebanon), of which there is a great quantity.

At Khan Alessar the Bedouins that we had with us were very anxious that we should take another sheikh, which, however, I positively refused; and after, as usual, great talking, they

yielded the point; soon afterwards they wanted me to pay for corn for their horses, which I again refused, and again there was a row. I had bother enough to-day to drive any reasonable person mad: almost every minute of it I was expecting that we should come to blows; but happily I had seven barrels about my person, which I took good care to let them know; for it is still the fact that throughout the country of Ishmael "every man's hand is against every man." I was obliged frequently to ride backwards and forwards between the boats and the baggage, to know the relative position of each, and to appoint places where we should meet; but happily the river became much better after passing Khan Alessar, so that the boat got on very well. Once or twice the Beni-Sakhers were afraid of the approach of the Anizees (Aenezes), with whom they are at war, and, dismounting their horses, some of them went to the top of the nearest sand-hills to look out. I found a railway-whistle, that I had taken with me, a very useful appendage to our operations, as it was heard a long way off. At about four o'clock, having now travelled about seven hours, we agreed to stop for the night; but when the tent was half-pitched the sheikh declared that he was afraid to sleep there, and a row ensued in consequence of my refusing to proceed, but it gradually subsided. I saw to-day in the jungle a large wild boar, and a small herd of gazelles, as well as great numbers of jackals; and also doves, eagles, and vultures innumerable; but I had too many other things to do to trouble myself about them, and indeed I was afraid to discharge my barrels. The two sheikhs went away about six o'clock with the letter from the governor of Tiberias to find the sheikh who is to go on with us; and about two hours afterwards the two who remained with us rushed into the tent, saying that some other Bedouins were coming, and we all had to turn out with our arms. We mustered altogether twenty-two barrels; and our ammunition being laid out already in the tent, we should have been able to keep up a good fire, as we were encamped on a nice shingle-bank, about 80 yards long and 30 wide, with the river on one side and the thick bush on the other. It proved to be a false alarm, as only two horsemen issued from the bush into the moonlight, and they were quickly recognised to be two of the party who had gone in search of the other sheikh. It would be quite impossible to give any account of the various turnings of the Jordan in its way from the Lake of Tiberias to the Dead Sea; it was well and quaintly described in a newspaper I saw the other day as "the crookedest river wot is." *

* 10 P.M., thermometer in tent 92°.

Friday, 27th.—Our two sheikhs returned last night, and said that the sheikh of the Ameers, who is to go on with us, would arrive in the morning. We had great trouble with our Bedouins this day. After paying the Beni-Sakhers, who had accompanied us from Abadiyah, which was a very noisy and vexatious operation, we were left with the brother of the sheikh of the tribe; and no sooner was the boat out of sight than he began to talk about payment, and even asked 25*l.* to accompany us to Jericho, where at first they said they would go. We found out, however, that their tribe extends no farther than Abou Obeidah, near the river Zerka, and that they dare not go beyond that place. After the usual altercations, we agreed to give them three dollars for to-day, and to arrange at our resting-place about the rest. The place at which we had bivouacked the Arabs call Attah, and there the lower valley, through which the river more immediately runs, breaks out into a magnificent plain, extending from the foot of the hills on either side across the Ghor, but with a high step on the western side, where the large Arab village of Beisán stands. On setting out we were soon obliged to mount to the top of the high western ridge, and passed that village at some distance about 9h. 30m. The country here appeared very different from that which we had passed since leaving the Lake Tiberias. The higher ground abreast of Beisán, and as far as I could see to the southward, is fertile, well-watered, and cultivated, chiefly with Indian corn. It is also thickly inhabited; for hundreds of small sheds might be seen studded on the plain with men watching the crops, and slinging stones to keep off the birds. I think the view from this point over the valley of the Jordan was one of the finest things I had seen—an abundant vegetation extending up the slopes of the eastern hills, which are crowned with trees up to the summit, and everything growing in the wildest luxuriance; while on the western side the higher steppe breaks down into steep sand-hills or whitish perpendicular cliffs, with only here and there the means of ascent. The river, as usual, winds very much, with banks about 20 feet in height, of brown clayey soil, somewhat resembling those of the Thames, and for some distance on either side a thick and almost impenetrable jungle.

We made but a short journey to-day, as it was necessary to send back to Beisán to get barley for the horses, and also food for the Arabs; and we therefore pitched our tent on the small island of El Kerma, on the western side of the river, being a safe position; for I did not half like the look of the people. While riding I killed two doves at one shot from the back of

my horse, which had a good effect on the Arabs.* At about two o'clock the head sheikh arrived; and in his presence, after the customary abominable row, we agreed to give four men 40 piastres each to take us to Abou Obeidah in two days, and to the arbitrator (rather a fine fellow) a dollar as his share of the booty. Soon after his departure our escort began to be troublesome, and the sheikh demanded 150 piastres for himself, besides what we had agreed to pay; but I told him that rather than pay it we would put the boat on the camels (which, however, was impossible), proceed as we liked, and defend ourselves. They then waxed sulky, saying they would not go at all; and at sunset they actually mounted and rode away, saying that we might get out of the scrape as best we could. We lost no time, therefore, in preparing for a serious quarrel, as it was not probable that we should get through the night without one, or reach the Dead Sea without a fight. We despatched the guide and one of the muleteers to find the other sheikh, with whom they returned in an hour, and we all sat down at the door of the tent and commenced haranguing. The old sheikh said it was not safe for us to remain where we were, and pressed us vehemently to leave the boat and the river, and go with him and the baggage to his tribe; but at last he agreed to leave one or two of his men with us, whom, in case of a row, I promised to defend. This old sheikh, Emir Nasr—a fine-looking fellow, with eyes that looked through one, and a tremendous jet-black beard—after all was settled, took his leave.

The river to-day, so far as we came, was very good for the boat; but in the upper part of it, I am within the mark when I say that there are many hundreds of places where we might have walked across, without wetting our feet, on the large rocks and stones. I never expected one-tenth of the difficulties that we had already experienced, and I was a good deal knocked up by the sun to-day, for the first time—it was, indeed, almost insufferable, but fortunately the men as yet are all well. I hoped to get down to the Dead Sea in four or five days; but it was almost like moving an army in an enemy's country—not only looking out for positions where we could not be taken by surprise, but anxiously looking out also for supplying our commissariat; for though the muddy Jordan is throughout full of small fish, yet we began to fear about our provisions, and determined to rely more on our guns for something to eat, so that we might save what we had for the Dead Sea. We succeeded, however, in getting some melons and

* 1 P.M., thermometer in tent 108°.

flour from Beisán to-day; but the Bedouins generally will sell nothing—indeed they appear to have but little to spare, rich as the country appears to be.

The Arabs we now have are Ameers, and differ from the Beni-Sakhers in having a quantity of black ringlets about their faces, while the latter have only a few locks on the top of the head; indeed I have scarcely seen a man since leaving Tiberias who had not jet-black whiskers, beard, and moustache.

From seeing a quantity of deposit in the plain of the Jordan to-day, and the marks of water in various places at a distance from the river, it was evident that the Jordan widely overflows its banks; and the sheikh informed me that in winter it is occasionally half an hour across; which accounts for the luxuriant vegetation in this part of the Ghor.*

Saturday, 28th.—A heavy dew fell last night; and as I slept at the door of the tent, I woke up wet through; but we set off at 7 A.M. The river continued to be very good for the boat, but there was nothing like a road for the camels; so that, having sometimes to ascend the sand-hills, and at others to traverse the marshy banks of the river, we had some difficulty in getting the baggage animals along. The country during the early part of the day was very fine, well watered, and fertile: our road lay through the best part of the valley; but very soon the higher terraces on either side began to close in, and to narrow the fertile space below; the hills became irregular and only partly cultivated; and by degrees the whole Ghor resumed its original form, and quite different from the neighbourhood of Beisán. The zig-zag course of the river was prettily marked by lines of green foliage on its banks, as it veered from the cliffs on one side to those on the other.

At nine o'clock we pulled up with the baggage at an Arab encampment on the western terrace, where a great sheikh resides, of the name of Namre. We entered his tent and drank some boiled milk and coffee, surrounded by forty or fifty savage-looking Bedouins, who rode up, and sticking their spears in the ground, tied their mares to the tent-ropes. The whole plain seemed full of these horsemen, belonging to the tribe of Ameers, riding through the fields of Indian corn, spear in hand.

At 11 A.M. we rode down to the river, forded it, and pulled up on the other side to await the arrival of the boat, which was far behind in consequence of the great windings of the river, and our sheikh tried hard to oblige me to remain there

* 11h. 30m. P.M., thermometer in tent 83°.

for the night, but I insisted upon proceeding. His object was to keep us three days between El-Kerma and Abou Obeidah, instead of two, according to his agreement, and thereby to get more money; while I was very anxious to get down to the Dead Sea, and over this part of the business, which was one continual scene of squabble and trouble. The sun was extremely hot, but at 12h. we again started, and found some difficulty in getting along near the river, being obliged to wind about among the ravines and sand-hills, which here approach close to the river. About 1 o'clock a number of men armed with muskets came down through the bush on the opposite or western side, forded the river, and came round us. At first I did not know what to make of them; but they came up and saluted our chief by kissing his cheek, and they seemed to be a better and more industrious set of men than the Bedouins, for they cultivate the ground and attend to their flocks of sheep and goats. In consequence of their being frequently robbed by the roving bands of Bedouins, the pasha had given them permission to carry arms, and occasionally assists them in beating off those land pirates; and, seeing our escort descending the hills armed with spears, and not knowing who we were, they had turned out to defend their property. They had good countenances, and seemed to be quite a pastoral race; but where they came from I do not know, for there were no tents or houses near, and there could not have been less than a hundred of them round us while we were pitching the tent. After expressing considerable surprise at us, our arms, and our boat, they left us, peaceably re-crossed the river on the eastern side, and disappeared in the brushwood; and we finished our encampment, close to the river on the eastern side.

We killed a partridge, a duck, some doves, plovers, and curlews during our passage down the river, and I saw also a gazelle, but did not get a shot at him. There had been a few shallows in the river, and occasional obstructions to the passage of the boat from trees, &c.; but, on the whole, she was nearly able to keep up with the baggage.

I learned from our sheikh that his tribe (the Ameers) numbers about 800 men; the Beni-Sakhers 600 or 700; and the Anizees 15,000 or 16,000.*

Sunday, 29th.—We started at 6 o'clock from our resting-place, which the Arabs call Fath-allah, and, after giving directions to the boat, we mounted the hills to the eastward of the river. The Jordan here runs near the foot of the western

* 2 P.M., thermometer in tent 106°; 8h. 30m. P.M., 102°.

mountains, which fall away in steep cliffs to the water's edge, so that the narrow plain of the river, in but very few places, attains to the breadth of half a mile of cultivated ground. The lower hills to the eastward, on the slopes of which we passed with the baggage, can be considered little more than a continuation of the high range of mountains; they are barren and uncultivated, with the exception of occasional wooded patches, and here and there some stunted shrubs or trees covered with sharp thorns. I was much annoyed to-day at being again obliged to diverge considerably from the river with the baggage, and therefore being long without seeing the boat. The water also was very bad, having many shallows and some large falls, and the ruins of a bridge took much time to pass, so that the boat was nearly six hours and a half traversing a distance by water which we walked over quietly with the baggage in three.

At 12h. 30m. the boat reached a place on the river not far from Abou Obeidah, and about one hour and a half to the north of the Wady Zerka, called by the Arabs Seguia. Here we were obliged to remain for the rest of the day, as our sheikh Nahif was afraid to go on the river, being at war, as he said, with the tribe on the opposite side. We therefore sent him by land to Abou Obeidah, to fetch the sheikh who was to go on with us. In the evening he returned, saying that the sheikh would arrive in the morning, but that he would want a good deal of money. I therefore, though with some difficulty, persuaded two Arabs of the country, who were well acquainted with the river and its neighbourhood, to go with us in the morning, and by this means I was in hopes that we should be able to get on without having anything further to do with these villainous Bedouins for the rest of the journey.*

The cliffs on the western side are soft limestone, quite bare, and in some places they cannot be less than 300 or 400 feet high. In one spot only I observed them to be of a reddish hue. Shot doves enough to-day for dinner; and the men in the boat saw two tigers and a boar.

Monday, 30th.—We got away from Seguia at eight in the morning, Nahif and his men having left us at sunrise; but, to our disappointment, the two Arabs who had agreed to accompany us to Jericho hauled off this morning, on pretence that they were afraid to leave their corn; and when the sheikh to whom Nahif went yesterday came from Abou Obeidah, he brought four men with him, for whom his charge was very great. I could not prevail upon him to send one or two only

* Thermometer in tent from 100° to 105°.

as guides ; and, as I could not afford such an expense, I resolved to try what we could do by ourselves. The guide whom we had brought from 'Iberias, and who was a good man, was put in the boat along with the other man who had hitherto been assisting there, and Toby and I remained on shore to take care of the baggage. At eight we sent off the boat, and then, fording the river, we rode up on the higher ground to the westward. We had not proceeded far before we saw two Bedouins galloping down to our right, and gradually closing upon us ; and, therefore, not knowing how many more might be following, we tied all the mules and camels together, got our arms ready, and when they came within hail demanded what they wanted, warning them to come no nearer, or we should fire. After making some sneering salaams they retired ; but not before we perceived that one of them belonged to the five fellows whom we had in the morning dismissed from the tent, and I suppose had followed us, hoping to find the baggage unprotected. Soon after this, being on the top of the cliffs, we saw the boat below us, and waved to her to go on. At half-past nine we were abreast of the large old square castle of El-Rabua, perched upon the top of Jebel-Ajloun, where Ibrahim Pasha, when he held this country, kept an Albanian guard ; but at present no one inhabits it. At Seguia the river continued to run near the western hills ; and between Abou Obeidah and the cliffs which terminate the upper ground on that side, there is a considerable plain with many trees, and apparently well cultivated. This plain may extend perhaps eight or ten miles from north to south, the river Zerka bounding it on the latter side. The Jordan there again crosses the Ghor obliquely, and everything, except about its immediate banks, becomes barren and desolate. At 12h. 30m. p.m. we descended from the upper ground into the plain, through which the river runs, and which is here very remarkable, being particularly level and very green ; and the contrast between it and the white cliffs which bound it on either side making it look like one large green river. A short distance above our point of *rendezvous* the river Zerka runs into the Jordan from the eastward, watering (as far as I could see) a small fertile plain similar to that through which the Jordan flows, the white chalky-looking cliffs on each side being about the same height and having the same appearance.

On our arrival on the banks of the river, about a mile below its junction with the Zerka, we saw 40 or 50 armed men, with a number of camels, lying about among the trees ; they were on their way from Es Salt to Nablous with burnt weeds, which are used in making soap, and they behaved quietly enough to

us. An hour after our arrival they went on their road, and we, as usual, stuck Toby's spear in the ground, with the ensign flying on it, as a signal for the boat to bring up, intending to proceed as soon as she arrived. The last time that I had seen her was from the top of the western cliffs; she was then nearly abreast of us, and notwithstanding the windings of the river, as the water was good, and as she had four men to pull and one to steer (Grant, Lyscomb, Winter, with the guide we had brought from Tiberias, and the man we had engaged by the road), I expected her arrival in about an hour. When I found she did not appear I began to feel anxious, and dispatched one of the muleteers up the bank of the river, thinking that she might have mistaken the place of rendezvous, but he soon returned without having seen anything of her; and two other men, who were then sent, came back with no better success, although they went as far as the Zerka and to the hills above. In the mean time two Bedouin horsemen, accompanied by four men on foot, had ridden down, reconnoitred us attentively, and remained near us about an hour; and as it began to get late in the day, I made up my mind to encamp where we were for the night. I therefore looked out for a better position, out of the thoroughfare, and moved all the baggage and animals to a narrow strip of beach between the river and the bush. This being done, and still no signs of the boat, I purposed going in search of her myself; but not being able to speak the language or make inquiries, I was persuaded by Toby to remain with the baggage while he, with one of the muleteers, should ford the river and ride up the eastern bank in search of her. After most anxiously awaiting his return for an hour, he came back full gallop to inform me that he had found the boat; that she had been attacked; and that he had learnt this painful intelligence from the guide and the other Arab, who were now alone bringing her down the river. Their account to him was, that shortly after I had seen the boat from the cliffs, and waved to her to go on (and therefore about the same time that the two Bedouins had ridden up to us), 40 or 50 persons had collected on the banks on each side of the river, armed with muskets; that two-thirds of these men were blacks, belonging to the tribe of the Messallieks; that they commenced their attack by throwing stones at the boat and firing into the water close to her; and that, after they had thus terrified the men, they all waded into the river, seized upon her, and dragged her to the shore. Lyscomb, who drew a pistol, was knocked into the water by a blow of a stick; and, having got the boat on the shore, they robbed the men of all their arms and ammunition, took their hats, and let them go. They also robbed the two

Arabs of their arms, and of most of their clothes, and threatened to kill them, but let them off with a beating. This was all the intelligence he could then obtain; and, as may be supposed, I was thunderstruck by the recital of these melancholy facts. The guide and the other Arab had remained by the boat for half an hour, hoping that our men would return; but seeing nothing more of them, they concluded that they had endeavoured to follow me, and accordingly they proceeded down the river with the boat.

It was now six or seven hours since Grant, Lyscomb, and Winter had left the boat, so that had they taken the right road they must have been with us some hours back. To remain long where we were I felt would only be to wait to be attacked by overwhelming numbers; to go back would be to face the whole of this villainous tribe, and I was perfectly ignorant as to what there still might be between us and Jericho, and therefore put all the baggage on the cattle and prepared for a start. The boat arrived in half an hour; and as I could at first get no one to undertake to go on with her, we hauled her up into the bushes, hoping to return with strength enough to carry her away. But at length the two men who had brought her down offered to take her to Jericho. She was immediately launched. I gave them some bread and biscuit, and directed them, in the event of our not reaching Jericho, to proceed to Jerusalem, and to let the consul know where we had last been seen. It was dusk when the boat left us, and having disposed our arms to the best advantage, and filled my pockets with ammunition, but with a very heavy heart, I set the animals in motion, and with Toby followed them up the same road by which we had in the morning descended from the higher ground to the river. The party consisted of two camels laden with the spars and boat's gear, and driven by an old man mounted upon a donkey, and five mules laden with baggage and provisions for men and horses, three of which were intended for our comrades, should we happily find them. The man we brought from Segua as guide (and who was the most perfect specimen of a boor I ever beheld) rode one of the mules, carrying Toby's spear. As soon as we reached the top of the cliffs we left the regular path, and turned into the bushes to avoid being seen, as we felt sure, after what had taken place, that a good look-out would be kept upon us. Here we had some doubts of the fidelity of the guide, as he twice tried to take us back into the regular road; but Toby, riding alongside of him with a drawn sword, preserved him from making further mistakes. For two or three hours in misery and distress of mind, silently and in the dark (for the moon was not yet up) we wound about the

ravines and bushes, in vain calling out the names of our lost friends, as loudly as prudence would permit. My horse fell down the side of a hill; the guides, camels, and mules tumbled by turns; every moment we expected a crowd of ruffians to rush upon us; and at one time we lost our way, and had to go round through a long 'wady' full of water and trees, but which perhaps may have helped to save us from being perceived, as it necessarily took us into very unlikely places for laden beasts to travel.

We were now nearly in the centre of the Ghor, surrounded by tribes of the greatest possible rogues, in despair of finding our poor people, and the moon just rising above the hills; and considering that it would be utterly impossible, if we remained, that Toby and I could stand against the numbers who would surround us in the morning, I resolved at once to traverse the 30 or 35 miles of country which separated us from Jericho before daylight, and from thence to dispatch the strongest guard I could collect in search of the men. Heart-rending it was indeed to adopt this course, and thus apparently to abandon our three unfortunate companions; but I could see no other possible means of helping them. Daylight would certainly have brought multitudes of savages about us, and however dearly we might have sold our lives, it is impossible that they could have lasted long.

We therefore took our course along the foot of the western mountains, and for ten long hours we kept constantly moving as fast as the camels could go, without a single stoppage, but preserving the most perfect silence throughout, always avoiding everything like huts or habitations. As we approached Jericho we broke off too much to the right, lost our way, and had partly to retrace our steps; and as we carried no water, and the night was very hot, we were nearly dead with thirst when at five o'clock we reached a small stream called Aïn es-Sultan. It had once been apparently conveyed across the valley by an aqueduct, but it now runs under the arches; and having stopped there a few moments to drink, we reached the Castle of Jericho about half-past five, just as the sun shone down into the valley. Nothing but the excitement and sense of danger had preserved us from falling off our horses; and even as it was, I was obliged to walk a considerable part of the distance to enable me to keep my eyes open.

Tuesday, 31st.—On our arrival at Jericho I immediately went up to the old governor in the castle, produced the letter from the governor of Beirout, and by my urgent entreaties succeeded better than I ever did before with a Turk; for in a short time four soldiers well mounted and armed, and accom-

panied by the muleteer, were off in search of our lost friends. I sent by the muleteer some rum, water, and bread, and a note for Grant; and the man we had brought from Seguia as guide I desired to go up along the river-side in search of the boat, so that if we should happily find the men, we might yet be able to carry out our project.

The valley of the Jordan, from the place where we were attacked down to the neighbourhood of Jericho, needs but little description, being much the same throughout. The lower valley is about three-quarters of a mile broad; and within those bounds the river winds extremely. The cliffs on either side have still the same whitish, chalky appearance, and fall away abruptly from the upper land, which, both to the E. and W. of the river for the last 30 miles of its course, has a barren and desolate appearance, and is but little cultivated. Near Jericho the formation of the ground becomes less regular; the western mountains, in one or two places, jut out considerably into the Ghor; the cliffs less exactly mark the bounds of the lower plain; and just abreast of Jericho, near the bathing-place, the descent from the higher ground is by a number of rounded sand-hills. A large patch of green stunted trees and shrubs marks the site of what is supposed to be the ancient Jericho, and here and there are to be seen the remains of some considerable buildings, with fragments of an aqueduct at the foot of the hills to the N.W. of the modern village. Around this mud-built village there is some cultivated ground, watered by two streams, one of which flows from Elisha's fountain.

After the horses had been fed and rested, Toby and I started, accompanied by one man, from the castle, in time to reach Jerusalem before sunset, the gates being closed at that hour. About three miles from Jerusalem we met the consul, Mr. Finn, who, with a guard, was on his way to Jericho for the purpose of hearing some tidings of us; and he immediately turned round to introduce us to the Pasha. This being Ramazan, his Excellency sleeps throughout the day, eats at sunset, and after that transacts business; he was therefore still at his evening meal when we called. We had to talk a great deal before we could get anything out of him; he made several excuses—first, that the place where the affair took place was not within his jurisdiction; secondly, that the Bedouins were rebels, and that the Government was unable to do anything with them; but at last we persuaded him to write two letters, which we dictated, one to the governor of Nablous, directing him to send in search of the men throughout the country, and bring them as speedily as possible to Jerusalem or Jericho; and the other to the Pasha of Damascus, within

whose pashalik is Abou Obeidah, requesting him to take any measures in his power to recover the men and arms. He then consented to give me ten soldiers to go with me to Jericho, and to accompany me in any search that I might myself undertake. He also promised, when my search was over, to order five men to escort us from Jericho to the Dead Sea, should I still determine to embark on it. I slept at Mashallum's hotel, and the consul kindly agreed to go back with me and the soldiers to Jericho in the morning.

Wednesday, September 1st.—The consul having duly come to the hotel, we started at eleven o'clock; and I took with me a Greek belonging to the hotel, who had been two or three years at sea. We found our Turkish soldiers very slow in moving, and before we had travelled an hour and a half they stopped at a fountain to rest, so that we did not arrive at Jericho till half-past five.

The two Arabs had succeeded in bringing the boat down the river; she was now at Jericho; but they had fallen in with more Bedouins, who, finding that there was nothing in her worth taking, had allowed her to pass. Soon after our arrival we dispatched through Mustafá (the Agha of our soldiers) two Bedouins belonging to the country to the place where I thought there was most chance of getting some tidings of our lost men, and we employed ourselves in finding out all we could about the men who attacked the boat, their names, tribe, &c., and made arrangements for sending the particulars to the Pasha of Damascus. The Prussian consul, Dr. Schultz, came from Jerusalem to see if he could be of any service, having heard of our misfortune, and pitched his tent near ours. I received through Mr. Finn this morning a letter from Captain Symonds, stating that he purposed leaving Beirout on the 3rd, and hoped to be at Jaffa on the 6th of September.

Thursday, 2nd.—Being Ramazan, we could not get the Turkish soldiers to make a start till after their midnight meal; at one, however, they turned out, the drummers, with their two small kettle-drums at their saddle-bow, sounding the call to mount. The moon was well up, and by its light we rode through the stones and prickly bushes of Jericho, putting the guide who accompanied us the other night in front. Besides him there were sixteen soldiers, the English consul and his man, Toby and myself—quite a little army. We passed over the same road which Toby and I had traversed the other night, but at a much quicker pace; and as we passed the ravines and places of concealment I always sounded a railway-whistle, which the men would have recognised at a considerable distance. We rode on till sunrise, yet no signs of our lost

men; and about seven o'clock, having ridden fast, we reached the upper ground near which we had commenced our retreat. For some time we continued to rove about the sand-hills and over a considerable space of ground, occasionally making inquiries of the old women and boys who were burning weeds in the ravines, till at last the Agha said it was impossible to go further; the horses were already suffering, and he must return to Jericho. We therefore made one more circuit among the mountains, and commenced retracing our steps from the place where I had last seen my poor men. We met several people, to each of whom we promised a good reward should they bring the men, or any information respecting them, either to Beirout or Jerusalem. This was all I could do; and, under a broiling sun, and much distress at our failure, we rode back to Jericho, having been twelve hours on horseback, riding fast, and almost without dismounting, so that some of the soldiers were much exhausted before they reached the spring at which we had stopped on Monday night. Soon after one we reached our tent outside the castle, and I began to think what should now be done under existing circumstances. The boat had arrived, and we had everything at hand except, alas, the men. Had they been present I should have at once embarked on the Dead Sea; but all interest in our original project was lost until I could hear of their safety. Yet I could not help flattering myself that they were safe; for as the Arabs had not attempted to injure them personally, there were great hopes that they had struck across the mountains for the coast; and as I had constantly shown them our track on the map, there was every reason to suppose that they were well acquainted with its position. If I could have ascertained that any bodily evil had really befallen them, I should at once have returned to the coast; but as I did not despair of their safety, I hardly considered myself justified in doing so. On the other hand, I was in such a desponding and gloomy mood that I had no energy to undertake any enterprise. Yet, should the men have happily reached the coast in safety, I should for ever reproach myself, after vanquishing so many difficulties, and getting the boat and everything necessary to the very point, if I threw away the opportunity and returned without accomplishing anything. In short I knew not what to do.

At eight o'clock the Agha came into our tent and inquired about my future proceedings. I told him that I proposed sending the boat down the river in the morning, and if he would give me the soldiers promised by the Pasha, I would ride down with them and Mr. Finn as early as possible to the mouth of the Jordan, and then decide whether it was prac-

ticable to go afloat or not. If I found that I was obliged to give up the matter for want of men, or from any other cause, I should at once put the boat on the camels, and return to Jericho; otherwise I intended to pitch the tent at the mouth of the river, and leave it standing in charge of the guard till I came back with the boat. To this arrangement he consented, and promised to be ready by sunrise. After drinking some tea and smoking sundry pipes and narghilés, Mustafa retired into the castle to sleep.

Friday, 3rd.—Notwithstanding the Agha's promises, I was unable to get him out of bed till long after sunrise; so in the mean time I dispatched three men to take the boat from the place where she lay, abreast of Jericho, down to the mouth of the river, and then I sent the baggage and all the boat's gear there in charge of one of the soldiers. At eight o'clock the Agha made his appearance, the kettle-drums were sounded, about a dozen soldiers mounted their horses, and we all proceeded to the post. On our way we passed the ruins of an old Greek monastery, near which there is a spring of good water; and in about three hours and a half we reached the mouth of the river, where I was glad to find the boat at last floating on the sluggish waters of the Dead Sea. We had great difficulty in getting anywhere near the shore, on account of the marshy nature of the ground, several horses and mules having sunk up to their bodies in the mud; but at length we pitched the tent on a small patch of sound but sandy ground.

Having now made up my mind to make the attempt along with Toby, the guide we had brought from Tiberias, and the Greek whom I brought down from Jerusalem, we quickly prepared for embarking; and Mr. Finn and the Agha at 5 o'clock left me, taking with them all the soldiers, except two that were left to take charge of the tent. By 6 P.M. all was embarked; and, after spending a short time in cleansing ourselves from the mud, we shoved off from this vile place, just as it was falling dark, with only two oars, and with no one who had much idea of using them, except myself, or any notion of boat-sailing. Under these circumstances, as I made sail and lost sight of the northern shore, I could not help feeling that I was embarked in a silly if not a perilous undertaking. The breeze gradually freshened till there was quite sea enough for such a little craft; but I continued to steer about S. by W. till 2h. 30m. A.M., having passed several large patches of white frothy foam; and, as the sea made an unusual noise, I was many times afraid that they were breakers.

Saturday, 4th.—At half-past two, thinking we must be approaching the southern end of the sea, I hauled to the wind,

and stood over towards the western shore. As daylight broke I found myself about 5 miles from the S. peninsula and about 2 miles from the cliffs which bound the sea to the westward. The breeze then died away, and by 7 o'clock it was calm. The sun had for some time poured its rays over the tops of the eastern mountains into this misty furnace, and we all felt very much as if we were in a well-heated oven. From Rás-el-Feshkah, at the northern end of the sea, nearly down to the peninsula, the western hills rise almost like a perpendicular wall to the height of 1200 or 1500 feet; and in one small gap only about Engiddi was there the slightest sign of vegetation in the ravines which seemed to betoken the presence of water. But I did not attempt to land, the heat being too intolerable, and having been strongly recommended not to do so, as the Bedouins occasionally approach the shores. The mountains on the eastern side are considerably higher than those to the westward, but slope down more gradually to the water's edge, and are broken by many large wadys or ravines. They much resemble some parts of the mountains of Lebanon, only they are more completely barren and scorched. Having taken a good look round, I stood off a little farther from the western shore; and when we reached the point where I thought the deepest water was to be found, judging from the formation of the land, I took a cast with the deep-sea lead. The extremes of the peninsula bore by compass about S.S.W. and S. $\frac{1}{2}$ E.; Mount Quarantana barely clear of Ras-el-Feshkah bore due N., and the farthest land visible at the N.E. end of the Dead Sea bore N.N.E. We paid out all the line, amounting to 225 fathoms, without feeling sure that the lead had reached the bottom; but it was no easy task to haul it up again, so insufferable was the heat, although we contrived some shelter from the sun by means of our coats and blankets. When the lead was up, we found some pieces of clear rock-salt adhering to the *arming*.

Soon after this a light air sprung up from the southward, in direct opposition to our course; which, added to what I had seen of the sea during the previous night, induced me, very much against my wishes, to give up all further attempt to reach the peninsula; and I therefore allowed the boat to drift gently to the northward, endeavouring to keep near the middle of the sea. The peninsula extends at least two-thirds across the sea. The cliffs which bound it have a whitish appearance, but are of no great height; they resemble those I had seen in the valley of the Jordan, and are not unlike parts of the island of Gozo. The water throughout was of a dirty sandy colour, like that of the Jordan: it appeared to be destructive to everything it touched, particularly metals; it had also a dis-

agreeable smell, and produced a very unpleasant greasy feeling when allowed to remain on the skin.

At 11 A.M., when the eastern point of the peninsula bore about S. $\frac{1}{2}$ W., the N.E. point of land N. by E. $\frac{1}{2}$ E., and Mount Quarantana about N. $\frac{1}{2}$ W., I sounded a second time, in 178 fathoms, and the lead brought up a quantity of dark clay or mud. The eastern hills about Ras-el-Tafilah, abreast of which point we were drifting, are peculiar, the different starta being distinctly marked.

About 1 o'clock, Ras-el-Feshkah bearing N.N.W., Jericho due N., and the south-western point of land visible S.S.W. $\frac{1}{2}$ W., we sounded the third time, and the lead came up covered with bluish mud, some of which I scraped off and kept. The depth was 183 fathoms. It now again fell calm; and by the time we had got in the line, we were all completely knocked up. At 3 o'clock we endeavoured to pull a little; but we made such miserable work of it, and the boat leaked so much, that everybody began to despair of getting back. At 5 h. 20 m. a breeze sprung up from the N.W., gradually drawing to the northward and freshening considerably; but the sea also got up so rapidly that the little boat took in much water, and we began to think what should first be thrown overboard, for she was too deep. Being unable to fetch along the eastern shore, about 6 h. 15 m. P.M. we went about, and spent a most wretched night endeavouring to hold our own by occasionally pulling a lee oar during the lulls.

Sunday, 5th.—We continued on the starboard tack the rest of the night, and at daylight found ourselves about two miles from Ras-el-Feshkah, having lost sight of the peninsula. The wind had fallen, and I was very anxious to sound again, but found it impossible, as no one could keep his head up, and even Toby was so chilled that I was obliged to give him some brandy. We managed to keep gently pulling against a light air from the north-west. At eleven o'clock we got sight of the tent; and at twelve we reached the shore, quite done up, and thankful for having escaped, which none of us expected to do the night before. Everything in the boat was covered with a nasty slimy substance; iron was dreadfully corroded, and looked as if covered in patches with coal-tar; and the effect of the salt spray upon ourselves, by lying upon the skin, and getting into the eyes, nose, and mouth, produced constant thirst and drowsiness, and took away all appetite.

As to the alleged destructive effect of the Dead Sea on birds flying over its surface, we killed some which were actually standing in the water; and on Saturday, while in the very centre of the sea, I three times saw ducks, or some other fowl,

fly past us within shot. I saw no signs, however, of fish, or of any living thing, in the water, although there were many shells on the beach. I must here mention a curious broad strip of foam which appeared to lie in a straight line nearly north and south throughout the whole length of the sea. It did not commence, as might be supposed, at the exit of the Jordan, but some miles to the westward, and it seemed to be constantly bubbling and in motion, like a stream that runs rapidly through a lake of still water; while, nearly over this white track, during both the nights that we were on the water, we observed in the sky a white streak, like a cloud, extending also in a straight line from north to south, and as far as the eye could reach.

Three remarkable points of land project from the eastern shore into the Dead Sea—Ras-el-Balkah, Ras-el-Tafilah, and Ras-el-Kerah—but I only observed one cape worthy of notice on the western side, viz. Ras-el-Feshkah, near its northern extremity. The cliffs are everywhere nearly perpendicular; and the tops of ten other ranges of hills and mountains may be seen rising behind them; but we saw neither buildings nor ruins on any part of its shores. At the northern end of the sea the water shoals gradually, and has a filthy, muddy bottom, at least in the neighbourhood of the Jordan. Farther to the westward we found a beach of shingle, covered with a greasy salt crust.

As soon as we reached the shore we took all the things out of the boat, and during the day packed up, ready for a start; after which we lay down, and had a comfortable sleep.

Monday. 6th.—At daylight we began to move, but the ground about us being much too bad for the camels to carry the boat, we put the tent and baggage on the mules, and two of the men having tracked the boat about two miles along the shore to a more convenient place to put her on the camels, we there hauled her up. As we rode along the beach to that place we saw a man following us, waving a handkerchief, and occasionally firing his pistol; so we pulled up to await his arrival, and to my inexpressible delight it proved to be the consul's Janissary, with a letter to tell me that the three lost men had reached Tiberias in safety; and he brought me also a most kind letter from Captain Symonds, enclosing a copy of the account that they had given him of their adventures. It would be a mere waste of words to state my joy at these tidings.

It was nine o'clock before we started the boat and the camels, and we then found considerable difficulty in getting her up the ravines and sand-hills to the plain on which stands the present village of Jericho, which the Arabs call Riha. On our arrival at that place we pitched the tent under some trees not far

from the old castle, and about five o'clock, while writing. I heard some horses galloping; and, running out, I was surprised and gratified beyond measure to find Curtis and Greaves, who had ridden up from Jaffa, and had come with Mr. Finn from Jerusalem to see me. We all dined in the tent, and spent a most jolly evening.

Tuesday, 7th.—About half-past seven, leaving Toby to bring on the boat, I pushed forward to Jerusalem in order to procure further assistance. I arrived there at 3 P.M., and lost no time in sending to him some fresh camels and six swarthy Arabs, for all which I had to pay 80 piastres. But it was not till 2 P.M. on

Wednesday, 8th, that he and the boat entered the walls of Jerusalem by the Damascus gate. In the mean time I went with the consul to wait upon the Pasha, and to thank him for all his civility.

Thursday, 9th, was passed in bargaining for camels to carry the boat to the sea-coast. On the 10th we finally left Jerusalem, and after two days I had the pleasure of finding myself once more on board H.M.S. *Spartan*, and of rejoining my three lost comrades.

XI.—On *Eastern Africa*. By Lieut. BARKER. (Communicated by Mr. M'Queen.)

[Read 8th May, 1848.]

THE islands of Mushakh having been purchased for the British Government from the Sultan of Tajourah, I had the honour of taking possession of them, in the name of Our Most Gracious Queen, on the 31st of August, 1840.

These islands are situated on a coral reef lying in a direction N.E. and S.W., 7 miles by $3\frac{1}{2}$ miles N.W. and S.E., consisting of one elevated about 30 feet above the sea in the highest part, with a few trees scattered about them, such as the mangrove, but not a drop of water. The N.W. end of the N.E. island is situated in lat. $11^{\circ} 43' N.$, and long. $43^{\circ} 19' 29'' E.$, allowing Bombay to be in long. $72^{\circ} 54' 26'' E.$, variation of the compass $5^{\circ} 30' W.$ There is a tolerable anchorage to be found in from 9 to 6 fathoms, muddy bottom, in a gap of the reef N. $39^{\circ} W.$, more than half a mile from N.E. end of Mushakh. Nearly in mid-channel there is a small rocky patch, having only 9 feet water. The soundings on this anchorage they have omitted in the printed chart. The rise and fall of the tide on the full and change of the moon, is 7 and 8 feet. The tides are, however,

very irregular, being much under the influence of the prevailing winds. Time of high water 7h. 15m. A.M.

Tajourah has been sufficiently described by Sir William Harris. I must point out, however, another error—in the map lately constructed, where there is 16 fathoms water, they have put down two small islets surrounded by a reef!

Joobul Kharib, situated at the head of the Bay of Tajourah, is worthy of a short notice from its extraordinary formation. The whole of this portion of Africa has evidently been subject to violent volcanic agency. This bay is connected with the Bay of Tajourah by two narrow channels. The whole width across from coast to coast being about three-quarters of a mile, with a small rocky isle, 40 feet high, situated rather nearer to the Dannakil than to the Eessah coast; the channel formed between it and the former being but 40 yards wide, having 17 fathoms, and the other about 350 yards, having but 3 fathoms on its rocky bottom. The bay lies in a direction N.W. by W. and S.E. by S., 13 miles by nearly 6 miles broad. The western portion is decidedly volcanic. The northern and southern sides are formed by precipitous limestone cliffs, from 400 or 500 feet to 2000 feet above the level of the sea, with very deep ravines. In the S.E. portion the water is deepest, there being 115 fathoms, with the shore equidistant to the northward. Just three-quarters of a mile, a line of soundings across the centre gave 105 fathoms.

In the western extremity there is a small basin, having 16 fathoms water in it, about 300 yards in diameter, surrounded by precipitous volcanic cliffs; the entrance is closed at low-water. Having a small gig with me, I had it carried across this barrier, and sounded all round the basin. Large masses of lava abound in this part of the bay. At a short distance from the small basin there are two islands called Good Alli; they are both precipitous: in one the traces of the lava, or the course of it rather, is plain; the other is of a reddish-white appearance, being thickly covered on all sides with some vegetable matter and earth mixed together.

There are so many reefs and dangers in the vicinity of Zeylah, that it is difficult to give a clear description of the place. The harbour is bounded on the west side by a range of sand-banks extending from Ras Tacooshah in a N.N.E. direction towards Taddickdeen Island, having three channels for small ships, each about 300 yards wide, 18 feet at low-water.

Zeylah is the only port on the Eessah coast. It is built on a low sandy cape called Ras Mahmahr. It has a wall round it in a very ruinous and dilapidated condition; there are a few

stone buildings and about 200 huts. At the time I visited it, it was a dependency of Mocha. The Governor generally resided at the latter place; his deputy governing for him, with a guard of about 30 Arab soldiers armed with matchlocks and shields. They have four or five very ancient guns. The people are supplied with water from the bed of a watercourse situated about 4 miles to the S.W. of the town, called Ta-cooshah, where there is a small round tower, and a guard of five or six Arab soldiers to protect the watering-place. They have an old iron gun, made of bars of iron hooped together. There are some few Arab merchants residing in the town, and some few of the Eessah Goodoo-boorie Somaulis. These people are not allowed to enter the town with their arms, depositing them at the gate.

From October to April, which is the rainy season, the coast from Goobul Karab to Core Kurangarub, called by the natives Bhurt Eesal or Eesaulie, is inhabited by wandering parties of the Eessah Somauli, who return to the interior as soon as the pasturage becomes scarce on the approach of the dry season. They are a very powerful tribe; said to be like the sand of the sea-shore for multitude; and are much feared by the Dannakil, who inhabit the opposite side of the Bay of Tadjourah, extending along the western shores of the Red Sea to Howakil Bay. These latter people describe Eessah as a race of treacherous thieves and murderers. As far as my experience goes, I found them a timid and inoffensive race.

They are professedly Musselmans, but do not appear to know much of the religion they profess. They lead a wandering life, dwelling not in towns or fenced cities, but roving about from place to place, wherever they can find pasturage for their flocks and herds. It is only a few of them that wear any clothing; most of them, both males and females, wearing a kind of leathern apron. They are armed with spear and shield, and also bow and arrows. They are said to be very expert in the use of their arms, more particularly the latter. The bow is formed of a very tough kind of wood, with but little spring in it; the spring being in the string, which is made of the entrails of sheep or other animals. The arrow is but 14 inches long, made of a reed very nicely feathered and balanced, with an iron barbed head; below the barb there is a small ball of poison; the head of the arrow is fitted so slightly into the reed, that it immediately becomes detached from the reed on striking any object, thereby rendering it difficult to extract. With these arrows they slay the ostrich, zebra, and indeed all kinds of animals.

They are very partial to red hair, dyeing it of that colour,

and are very particular in dressing it. Those who are not favoured by nature with good heads of hair make wigs of sheep-skin, dyeing them their favourite colour. I bought one of a man, who was trimming it by the road-side, for one dollar. They never wear the turban, or indeed head-dress of any kind. They only who frequently visit the coast know the value of money. They are, in common with other savage people, very fond of ornaments and trinkets. The produce of their country—consisting of hides, ostrich feathers, horns, ghee, or clarified butter, gums, &c. &c.—are brought to Zeylah, and there exchanged for trinkets and blue cloth (cotton of a very common kind), made at Surat and other parts of India.

Their chief is called Oogass, and is much respected. The title is, I believe, hereditary.

I know not of any rivers in their country; neither could I obtain any satisfactory data as to the extent of their country, except that it extends to the kingdom of Hurrurh—about which more anon.

While I was at Zeylah, in November, 1840, I saw a small caravan or *cafila*, as it is called here by the Goodoo-boorrie Somaulis, consisting of about 25 men and several women, with some few children. They had come to Zeylah to exchange the produce of their country, the same as that of the Eessah, for grain, blue cloth, &c. They gave me a description of the ruins of an ancient town, which they called Harrowah, nine days' journey to the S. of Zeylah. This must not be confounded with Hurrurh, which they also knew.

Berberah is the principal place of trade along the coast, on account of its beautiful harbour, which is formed by a curvature in the coast-line, and a low sandy cape, projecting out nearly at right angles with the general line of coast, to the distance of $1\frac{1}{4}$ mile nearly. The extreme of this sandy cape is in lat. $10^{\circ} 26' 20''$ N., and long. $44^{\circ} 6' 20''$ E. At the entrance the harbour is $\frac{1}{4}$ of a mile wide, with 13 fathoms mid-channel; direction of the harbour E.N.E. and W.S.W., gradually contracting and shoaling to five fathoms, within about 200 yards of the town. The tribes from the interior commence arriving about the end of October, and continue to do so till March. At the end of that month, in a few days, the place, from containing a population of 10,000 or 15,000, becomes totally deserted. About the time that the tribes commence to assemble, boats also from India make their appearance, as well as from the several ports on the coast of Arabia and from the Gulf of Persia. The imports are white and blue cotton-cloths of Indian manufacture; also piece goods, Indian handkerchiefs, brass and copper wire, zinc and

beads, dates and grain from the coast of Arabia, and some few prints for the Hurrurh market. Some English shawls I saw there were valued at 20 to 30 German crowns each. The exports are ghee, hides, deer's horns, ivory, gums, ostrich feathers, coffee, sheep and horned cattle.

I learned from several individuals that the ancient name of the coast, now called "Bhur Hebrawal," was "Bhur Eesakh," who was the father of the Somauli. He dying, left three sons, Aboo-ghur-hajiz, Hebrawal, and Aboo-teezaylah. The latter's mother was a slave. From these three are descended the numerous tribes of Somauli, the principal of whom are the Ayal Aboo-ghur-hajiz, Ayal Hamed, Ayal Gudeed, Ayal Shoor Drooan, Ayal Hosha, Ayal Mahomoad, and Ayal Grums. I could not obtain any information as to the strength of each tribe. In former years they inhabited the coast from Meeat, in the vicinity of Mette Island, eastward, to Cape Guardafui, and along the east coast of Africa towards the equator; but as the Galla, who then inhabited this part of the coast, retreated towards the interior, they occupied their places.

Like the Eessah, they lead a wandering life, halting from time to time at such places as they can obtain pasturage for their flocks and herds, in which they are said to be very rich. I do not think that they have any rivers of importance in any part of their country.

They profess the Mohammedan religion, but have but an imperfect knowledge of its tenets. I was too short a time with them to obtain any knowledge of their language, further than that it has not the slightest resemblance either to the Arabic, Amharic, or Hurrurhje (or that spoken by the Hurrurh people). Each tribe is governed by its own chief, somewhat after the patriarchal manner. The men, as well as the women, are tall, and of pleasing manners.

From Berberah the coast extends with a slight curve to the southward, towards Sayaral, on a line of bearing E.N.E. At Sayaral there is a tolerable anchorage in an open roadstead, 10 fathoms, about $\frac{1}{2}$ a mile from the shore. Good water may be easily obtained from a few small wells situated about 60 yards from the beach. The water at Berberah being very brackish, the inhabitants are supplied from this place; but a more unpromising place for water I have never visited—a barren, sandy soil, not a blade of grass to be seen in any direction, and in some parts the adjacent hills are covered almost to their summits with drift-sand. There is a very extensive burial-ground, but no inscriptions of any kind, and the ruins of a mosque. Tradition says that in former times there was a con-

siderable town here. Sayaral is in lat. $10^{\circ} 35' 26''$ N., and long. $45^{\circ} 22' 56''$ E. There are two rude stone buildings and five or six huts.

There is great difficulty in obtaining any information of the interior, either from the natives of the country or its inhabitants: no reliance can be placed on what the natives say, and there is great difficulty in getting to the interior, owing to the jealousy of the people.

Hurrurh may be said to be situated about 192 miles to the eastward of Ankobar, and about 150 S.S.W. from Zeylah. It is situated in a verdant valley, almost encircled by hills. It has a wall round it, of stones and mud, which is kept in good repair: the height thereof is 12 feet, and thickness 3 feet, and in circumference about 2 hours' quiet walking. There are five gates—Emá-e-deen Burri (which means gate), facing towards Shoah; Siektal Burri, towards the Arroosie Galla; Budderoo-Burri, towards the Alla Galla; Assoom Burri, towards Zeylah; Argoboh Burri, towards Berberah. The Galla approach near to the town on all sides, and N. towards the W. the Nooli Galla; W. towards the S. the Alla Galla (these are two powerful tribes, mostly pagans); to the N.E. dwell the Beero Galla, who are Mahommedans; and to the E., and thence towards Berberah, the tribes of Jarsoo, Babili, Bursoob, Burtera, and Gooti Galla, many of whom are said to be Mahommedans. The ruler of Hurrurh governs with the title of Emir. The present Emir's name is Aboo Beker: he has reigned seven years. The succession is hereditary, as is the case in Shoah. The male relatives of the reigning prince are all confined. It is said they are shut up in vaults, from which they are but seldom allowed to remove. Should the prince, however, at any time need their services, they are released, and frequently on such occasions preferred to situations of great trust. On the slightest suspicion, however, that they are plotting against the government, or should they become too popular, they are speedily sent back to their vaults again. The soil in the vicinity is very rich, producing coffee, wheat, barley, jowarie, &c. in great profusion. They have also a great variety of fruits and vegetables. Coffee is the most important export.

They have a small copper coin called mahalah, twenty-two of which are equal to a nominal coin called ashreeffi; forty ashreeffi are equal to one German crown. The mahalah resembles the small copper coin used about Jeddah: on the one side is written in Arabic characters "there is no God but God," and on the reverse the name of the reigning prince. Cafilas are coming from and departing to various quarters at all seasons. The principal are those that trade to Berberah, Zeylah, Chercher,

and Arroosie. There are smaller cafilas that trade to Arreea, Ogahdeen, and other parts of the Somaui country. Hence cafilas trade yearly to Berberah between the months of October and March, occupying from 30 to 40 days on the road. Camels are used for the journey, laden with coffee, ivory, ghee (clarified butter), ostrich feathers, gums, &c., and slaves, both male and female, are also exported to Zeylah as well as to Berberah. In return they receive blue and white coarse cotton and Indian manufactures, Indian piece goods, English prints, silks, shawls, red cotton-yarn, beads, zinc, copper, copper wire, &c.; and, from the Somaui country, frankincense and book-koor Somaui. The Hurrurh people are called "Hurrurhji," and also "Hurrij." They are rigid Mohammedans, paying strict attention to the fasts and ceremonies enjoined by the false prophet. Their language bears some affinity to the Amharic. They use the Arabic character. The climate resembles that of Alio Amba, which is 3000 feet below Ankobar. Hurrurh possesses advantages that certainly no other town on this side of Africa has of penetrating to the interior.

XII.—On *Eastern Africa*. By Lieut. CRUTTENDEN, I.N. (Communicated to Mr. M'Queen by Sir Wm. Harris, Political Resident, Aden.)

[Read 8th May, 1848.]

THE Bur e Somal, or Somali country, properly speaking, extends from Ras el Khyle, on the eastern coast, to the Esa tribe, who reside in the neighbourhood of Zeylah. The people of Mukdeeshah are not Somalis, but of the Haweea tribe. The river usually known as the Webbe forms their southern boundary, or, as they express it, is "the separation of the Moslemin from the Kaffirs" (under which common term they include English as well as Galla). The country, as you proceed to the westward from Cape Jered Hafoon, changes in its productions. Coffee in great abundance is found in the mountains of the Gidr Beersi, but no gums; whilst to the eastward the coffee vanishes, and the hills produce so great an abundance of gums that the "*regio thurifera*" ought, properly speaking, to be looked for there, rather than on the plains of Morebat and Háseh.

The Somalis, especially those who live on the coast, are fond of dating their origin from the Arabs. By their tradition, Sheikh Isaakh, an Arab chief of great sanctity, settled on the Somali coast near Mette, and, marrying a female of that place, became the father of the Habr Awal, Habr Gerhajis, and

Habr't el Jahleh, which three tribes extend from Mette to Jibel Elmiss in the present day. To the eastward of Mette we find the warlike tribe of the "Wursúngeli," which name means "has brought good news" (it is spelled in the chart Oor Singali, which is incorrect), and thence to the eastward round Cape Jered Hasoon, and down to Ras el Khyle, the country belongs to the numerous clans of the Mijjertheyn. These are the tribes on the coast. To the southward we find the country of Murreyhán, and next in succession to the westward the tribes of Dulbahanti, Burtirri, Abbaskool, Ghirri, Gidr Beersi, and Eesa, whilst the Bheer Whallea tribe inhabits the banks of the Webbe, and the province of Ogáhdén fills up the space between them and the Haweea, who reside on the bend of the river and on the coast of Mukdeeshah. This river Webbe, which takes its rise in Gurague, pursues, as far as my accounts go, a different course to that usually laid down for it. After leaving the country of the Bheer Whallea, it flows *more* to the E.N.E., and approaching near the sea some two days' journey to the N.W. of Mukdeeshah, takes a sudden bend to the S.W., and passing that town at 6 hours' distance, is finally absorbed in a marsh a little below the latitude of Brava, and about 6 days from the sea. Annual expeditions are made by the Mijjertheyn and Wursúngeli to the river, where they purchase ivory and myrrh with cowries, which they bring with them from Zanzibar.

From Ras el Khyle to Berbera, the Wadi Nogal extends in almost a straight line between two ranges of mountains. The "happy valley" is spoken of in the most glowing terms by the natives, and apparently forms their great road for trade. The people of Ogáhdén, Murreyhan, &c., bring all their gums, ivory, and ghee along this valley, as being the safest and least fatiguing route, and the people are described as a peaceful race, who subsist chiefly by the chase, and by their sale of ostrich feathers, myrrh, and ghee.

This valley would form an advantageous starting-point for a traveller, nor do I apprehend any particular danger. In a commercial point of view the Mijjertheyn and Wursúngeli territories are the most valuable, and I consider that a small vessel of 300 or 400 tons might with ease procure a cargo of gum arabic, luban, and myrrh, at any of the bunders belonging to these tribes. The fact of upwards of 800 tons having been exported during my stay of 7 months on that coast, from three ports alone, sufficiently attests the abundance of the article, and in some measure may account for the rapid fortunes accumulated by the Banians, in whose hands alone does this trade lie. Arrangements should be made with the mer-

chants on the Somali coast before the commencement of the foul weather, say the month of April, to have a cargo ready for the vessel by the 1st of the *Now-Rúz*, or about the 28th of August. The coast is then approachable, and the gums could be shipped off at Bunder Murayah, Bunder Khor, and Bunder Zeaada, or Bunder Ghasin, with but little delay. It is to be earnestly hoped that English enterprise will open this trade before long. The name of an Englishman is much respected by the natives, and they make a marked difference between them and any other nation. Promises of all kinds were made to me, that they would give every facility to the English merchant who would bring his wares himself amongst them, and who could thus afford to sell them cheaper, and one or two offered to guarantee a certain supply annually if arrangements were made in time. It would be useless, however, sending out a vessel without some person who understood the character of the people, and who could converse in Arabic with them without the aid of an interpreter.

To the westward of the Mijjertheyn hill, the Wursúngeli range, 4000 feet high, affords an inexhaustible supply of frankincense, though but little gum-arabic, and no myrrh. The climate on these mountains is described as most invigorating, and the country abounds in large game, the lion being very common in these parts.

Westward of the Wursúngeli the gum-trees become scarce, and though there are some parts having considerable trade throughout the year, all their gums are brought from the Dulbahanti and Ogahden tribes. Sheep form the chief article of export from Kurrum westwards, and the countless flocks that are driven down almost daily and shipped off for the Arabian coast exceeds belief. Berbera is of course the greatest mart at one season of the year, as all the tribes collect there, but an English vessel would do but little when placed in competition with the Banians, whose cargoes are, generally speaking, engaged the season before. I may here mention as a proof of the peaceful nature of the country, that frequently the Banians go for 20 days' journey inland, for change of air, and are allowed to live unmolested. I would not, therefore, advise a vessel to go to Berbera to trade, but endeavour to be off the sea ports to the eastward as soon as ever the season opens. The gums are then all packed in readiness for shipment, and but very trifling delay would occur.

To the westward of Berbera there are no trading ports until we come to Zeylah, where doubtless a vessel would get a valuable cargo of coffee and mules; but I fear much time would be lost. But a small quantity of gum is brought into

Zeylah—coffee, dye, and ghee, with ivory in small quantities, and ostrich feathers, form the articles of export; and though probably the present ruler, Sheikh Sherwarkhi Ali Saleh, will by his wise form of government eventually open the trade to Hurrur, it is a thing to be looked forward to, and does not exist at present. I should average the quantity of gums exported from the Somali coast at 1500 tons, though occasionally, after a good season, I believe that the Mijjertheyn tribe alone export nearly that quantity.

XIII.—*Remarkable Localities on the Coast of Epirus.* By JAMES HENRY SKENE, Zante. (Communicated by Mr. Greenough.)

[Read 12th June, 1848.]

Chimerium.

AFTER the defeat of the Corinthian naval force by that of Corcyra in the year 435 B.C., we read that the fleet of the former lay in the harbour of Chimerium, on the coast between the mouths of the rivers Acheron and Thyamis, and that the fleet of the latter was anchored at Sybota. The hostile forces are stated to have thus remained during a whole summer without meeting in battle;* and that three years afterwards also these respective fleets again occupied the same stations.† Chimerium is here described by Thucydides as being in the Elaiatis, and dependent on the town of Ephyra. The best work on the topography of this part of Greece ‡ attempts to prove that Chimerium was Arpitza, although its learned author admits that there exist objections to this conclusion. He is obliged, for instance, to give a forced meaning to the word *ἐπὶ*, which is used by Thucydides to convey the relative positions of the town of Ephyra and the harbour of Chimerium; because Cape Varlam, which he supposes to be the Chimerian promontory, is, by his own avowal, 12 or 14 miles from the probable site of Ephyra. The bay also, which he considers to be the harbour, is described by himself as being “a retirement of the coast with a sandy beach:” now this would be but a poor station for a fleet during many months, as the place happens to be exceedingly exposed to violent winds and heavy seas from the north and west, without any kind of shelter whatever. Moreover, such a beach would hardly be called a

* Thucyd., l. 1, c. 29 et seq.

† Ibid. l. 1, c. 46.

‡ Colonel Leake's *Northern Greece*, vol. iii. p. 5 et seq.

λιμὴν or "harbour" by Thucydides, as that of Chimerium is. The same modern traveller mentions a place called Agio Janni, or St. John, not far from his supposed Chimerium, and he adds, that "it is the best harbour in this part of the coast," but without suggesting any ancient name for it, further than vaguely hinting that it may be the post of the ancient town of Buchetium. It cannot be supposed that so good a haven should have been overlooked by the ancients: and not only is there no apparent reason why this should not be Chimerium, but also there, are strong appearances in favour of the idea that it is. First, Agio Janni is a harbour fit for a fleet to anchor in, and remain perfectly safe during a summer. Secondly, it is not more than a mile and a half distant from the supposed ruins of Ephyra. And thirdly, it is also between the mouths of the Acheron and the Thyamis. Therefore the description of Thucydides corresponds with Agio Janni; but there is a much stronger argument than these, and one which will, it is hoped, prove that this new topographical identity is correct.

I had occasion recently to sail into the port of Agio Janni in a small yacht, during a dark night, and blowing hard with violent squalls. In beating into the harbour I was astonished to perceive the sea become suddenly as calm as a mirror, although the wind was increasing, but the calmness lasted only for a moment, and had the appearance as if a few barrels of oil had been emptied over the waves in a particular spot. It was too late that night to make any investigation into the causes of this, but on the next morning I returned with a light breeze in search of the spot, and found a circular space of perfectly smooth water, the diameter of which might be about 40 feet; and it appeared to be raised above the surface of the surrounding sea. The water rose from beneath with such violence as to form a series of small circular waves beyond the ring diverging from the centre, which was turbid, and bubbled up like a spring. We steered across it, and found that the cutter's head swerved about as in a whirlpool, which convinced me that it was occasioned by a powerful submarine source, or perhaps the outlet of one of the Katabothra, or subterranean channels, which flow out of the lake of Jannina.

Now Pausanias mentions the fact of these phenomena existing on the coast of Argolis, and in Thesprotia, near the place called Chimerium, ἐν τῇ Θεσπρωτίδι κατὰ τὸ Χειμέριον καλούμενον.* The modern topographer† above alluded to thus describes the Deine of Argolis in his travels in the Morea:‡—"This is a copious source of fresh water rising in the sea, at a quarter of a

* Pausanias, Arcad., 7. 2.

† Colonel Leake.

‡ Vol. ii. p. 460.

mile from a narrow beach under the cliffs. The body of fresh water appears to be not less than fifty feet in diameter. The weather being very calm this morning, I perceive that it rises with such force as to form a convex surface, and it disturbs the sea for several hundred feet around. In short, it is evidently the exit of a subterraneous river of some magnitude, and thus corresponds with the *Deine* of Pausanias, who remarks, in the *Arcadics*, that the waters of the plain, in the *Mantinice*, called *Ἀγὼν*, or the *Inert*, flow towards a chasm, and that, after a subterraneous course, they re-appear at the *Deine*, towards the place in the *Argolis* called *Genethlium*; "here sweet water," he adds, "rises out of the sea, in the same manner as near *Chimerium*, in *Thesprotis*." * These two phenomena, therefore, strongly resemble each other, and they may well be mentioned by the ancient geographer as being similar. The modern geographer, in his travels in Northern Greece, † says himself that "if the remark of Pausanias were verified, who states that fresh water, similar to that of the *Deine* on the coast of *Argolis*, rose in the sea near *Chimerium* (that is, near *Arpitz*, which he considers to be *Chimerium*), there would remain no doubt on the subject."

The circle of smooth water at *Agio Janni* being also fresh, it therefore appears to be proved that that harbour, and not *Arpitz*, is the ancient *Chimerium*, and that the *Chimerian* promontory is consequently the cape which encloses it, and not *Cape Varlam*, as supposed by the author of the work just quoted. He concludes his argument on the subject of the *Deine* of *Argolis* with the following words, which may equally well be applied to *Agio Janni* and *Chimerium*: "The phenomenon itself is of too singular a kind, and answers too exactly to the words of Pausanias, to allow of any reasonable doubt of the identity." †

It is not without diffidence that I thus venture to start a novel opinion which is in contradiction to that of so distinguished an archæologist as Colonel Leake; but having chanced to discover a new datum on the subject, which, as far as I know, has not yet been noticed, I trust that a suggestion founded on it may not be considered presumptuous on my part.

The town of *Parga* stands nearly opposite to the small island of *Paxo*, which is one of the seven *Ionian States*; it is built on a rocky peninsula which separates two small bays, and which is so steep, that from the sea the houses almost appear to be

* Paus., lib. viii. cap. 7.

† Vol. iii. p. 6.

‡ Travels in the Morea, vol. ii. p. 481.

constructed one above another. A strong, though small Acropolis, defends the town, rising on the summit of the rock like a mural crown, and the harbour is protected by a small fortified island. The country around is rich in picturesque attractions, and the land in the vicinity of the town is abundantly fertile; it boasts of 80,000 olive-trees, fruitful gardens, and groves of citron-bushes, yielding a considerable revenue, and the attachment of the Pargariotes to their native soil was justified by many other advantages sufficiently obvious to those who visit the spot. The produce of citrons, many of them growing to the size of a man's head, was exported to Trieste, and a part of it found its way even as far as Poland, where it was made use of by the Jews for their religious festivals.

The modern town cannot date more than four centuries back, as the ruins now called Palæo, or Old Parga, were occupied before that period. By some Parga is considered to be the Ephyra of the ancient Greek geographers, while others hold, with more apparent probability, that the latter town stood on the right bank of the Cocytus, where there is now a ruined monastery.

Parga offers greater coincidences with the data belonging to the ancient Toryne, or Torone, where Octavianus anchored his fleet when going from the Ionian Sea to the Straits of Actium in order to offer battle to Antony. It may also be Buchetium, which the Epirotic allies of the Roman consul, M. Fulvius Nobilior, selected as a safe place for the imprisonment of certain Etolians whom they had taken near Cephallenia.*

This district was called Elaiatis from its riches in olive-trees, and the environs of Parga are still famed for their oil, but there may have been olive-trees near the Cocytus, now the Vuvò, where Ephyra probably stood. It was the town, according to Pausanias, in which Theseus and Pirithous were confined by Aidoneus or Pluto, king of the Molossi, after the failure of their attempt to carry off Proserpine. Saint Donatus is now the patron of this country, and it is curious that the common name given him by the peasants, *Ai Donat*, should resemble so much the name of its ancient king *Aidoneus*.†

About five miles to the south-east of Parga a much safer harbour invites the weather-strained bark, but a strong current flowing from it renders the access difficult, unless the wind is fair and strong. The entrance is narrow, being merely a gap between two lofty cliffs, but a wide and tranquil bay lies within: this haven, now called Porto Phanari, is considered to

* Polyb., l. 27, c. 9 (l. xxii. Tauchn.).

† Leake's *Northern Greece*, vol. i. p. 234.

be the Glykys Limen of the ancients, and with much more appearance of authority than that which was brought to bear on the port of Gomenitza.

The river which falls into Porto Phanari, and creates the constant reflux at the mouth of the harbour, is consequently concluded to be the Acheron of antiquity: it waters a vast plain, on which there are several villages, and which formed a part of the Plutonian dominions. The descent of Orpheus to the infernal regions was probably founded on a journey to this country; and the spot from which he looked back, like Lot's wife, and lost his Eurydice, may have been somewhere on the hills of Soul, which he must have traversed. A stream which is tributary to the Acheron, and which is now called the Vuvo, is supposed to be the Cocytus; while a small lake through which the former flows, is identified with the Acherusia Palus.

The accurate Thucydides,* when relating the course followed by the Athenian fleet from Leucadia to Corcyra, that is, from Santa Maura to Corfu, describes the river Acheron, the Glykys Limen, the Acherusian Lake, the Chimerian promontory, and the mouth of the Thyamis, in a manner which at once brings conviction with it, that these localities are the modern Porto Phanari with its environs, and the Calamas,† which proves that the Acheron fell into a bay small enough for the fresh water to diminish its saltness, which is the case with Porto Phanari, but not with the bay of Gomenitza.

The very ancient writer Scylax has the following passage, which illustrates and corroborates Strabo's topography of the Acheron: Ἐνταῦθα ἐστὶ λίμνην, ὃν ὄνομα Ἑλαία· εἰς τοῦτον τὸν λιμένα ποταμὸς ἐκίησιν Ἀχέρων, καὶ λίμνη Ἀχερουσία, ἐξ ἧς ὁ Ἀχέρων ρεῖ ποταμός. The harbour is here called Elæa, but it seems to have borne that name before it was known as the Glykys Limen. Livy‡ also confirms these authors by a statement which is thought to have been borrowed from the lost books of Polybius: "et Acheronte amni quem ex Molosside fluentem in stagna inferna accipit Thesprotius sinus."

This proves at least that the Lake of Jannina could have nothing to do with the Acherontian regions, as Meletius thought, and indeed it is surprising that, with such a mass of contradicting evidence, he should ever have found any one to agree with him and to follow his errors. Ptolemy's description also corresponds perfectly with Porto Phanari, and Eustathius gives the same data in his Commentary on the tenth book of the Odyssey. Pausanias likewise agrees with all these authori-

* Lib. 1, 46.

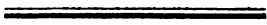
† Lib. 7, p. 324.

‡ Lib. 8, c. 24.

ties, and adds a testimony respecting the river Cocytus, which militates against the theory of that stream flowing into the Lake of Jannina, as none of those which do fall into it are remarkable for the taste of the water. He says, πρὸς δὲ τῇ Κιχύρῳ : λίμνη τε ἔστιν Ἀχέρουσία καλουμένη καὶ ποταμὸς Ἀχέρον ρεῖ δὲ καὶ Κωνυτὸς ὕδωρ ἀτερπέστατον.*

This epithet is fully applicable to the flavour of the stream which joins the river, whose mouth is Porto Phanari. Cichyrus is merely another name which was borne at a later date by the town of Ephyra. The Acherusian Palus, supposing the small lake to be it, is three miles long, and one and a half broad; no pestilential vapour emanates from it, but malaria is common here, and the ancients, ignorant of the nature of the marsh miasma, may have attributed its effects to deadly effluvia emitted by the infernal lake. The name of Glykys Limen, or harbour of sweet waters, has been lost to the Porto Phanari, but it has been preserved, not far distant from it, in that of a village called Glyky. So many depositions combined must leave little doubt as to the identity of these localities, and must completely refute the pretensions of the plain of Jannina to mythological honours, unless indeed, and it is far from being unlikely, some future discovery may prove that, although it may not be the realms of Pluto, it is the favourite haunt of the Dodonean Jupiter.

* Pausan. Attica, c. 17.



I N D E X.

- ABADIYEH, 111.
 Abbadie, Antoine d', xxxvii.; lvii. 48.
 Abbaakool, 137.
 Abd el halyf, 65.
 Abdul Kerim, 16.
 Abessinians, 56.
 Abomy, xxxvii. lviii.
 Abú'l Hamed Arabe, 10.
 Abú Telfan, 72, 73.
 Abú Delif, 11.
 Abú Obeidah, 114
 Abú Reyyáh, Kaleh, 16.
 Acosta, Col. Joaquin, lxix.
 Acheron, 143.
 Acherusia Palus, 143.
 Acre, 104.
 Adafoodiah, xxxvii. lviii.
 Adam, Mr., lvii.
 Aden, 65.
 'A'dhem (River), 2.
 Adúlia, 63.
 Æthiopians, 58.
 Ægyptus, 65.
 Africa, Northern, lix.
 ——— North-Eastern, 130.
 ——— South, lix.
 Afrikús, 56.
 Agame, 65.
 Agio Janni, 140, 141.
 Agows, the, 65.
 Alcibiade, ship, 90.
 Alessar, Khan, 112.
 Alexandria, 54.
 Aldrich, Lieut., 86.
 Al Káim, 9.
 Amante, xliii.
 Amazons, 95.
 Amazonians, lx.
 Ameers, 116, 117.
 America, lxii.
 ——— North, lxiii. lxv.
 Anizees (Aenezes), 113, 117.
 Anjou, Rear-Admiral, 21.
 Annesley, Sir James, xxxiv.
 Antarctic Seas, lxii.
 Antares, 2.
 D'Anville, 74.
 Arabia, li. lii, 54.
 Arctic Sea, lxiii. lxiv.
 ——— Expedition, lxiv.
 Arnaud, Mons. d', lviii. 50, 73.
 Arpitz, 139.
 Arrowsmith, xxxvii. xxxix. lx, 2.
 ——— river, xxxiii. 75.
 Arinoé, 63.
 Ashburton, Lord, xxxiii.
 Asia Minor, l.
 Ashik, 9.
 'Askarí, Imám Husein, 8.
 Assyria, lii.
 Ataboras, 53.
 At-Almo, 65.
 Ath-Agau, 65.
 Atlas, 74.
 Atrato, river, lxviii.
 Australia, lx.
 ——— Felix, lx.
 ———, interior, lx. lxi.
 ———, Western, xxxvii. lx.
 Ava, 65.
 Awal, Habr, 136.
 Ayrton, Frederick, xxxvii. 48.
 Ba'albek, 88.
 Bache, Professor, lxv.
 Back, Sir George, 40.
 Baghdád, l.
 Bakel, lix.
 Balkal, Ras el, 129.
 Ballantyne, Mr., lxv.
 Balonne, river, lxii.
 Bankes, 80.
 Barbadoes, lxviii.
 Barbudos, lxviii.
 Barker, Lieut., xxxviii. 130.
 Barrow, Sir John, 20.
 Barudoes, lxviii.
 Basel, 82.
 Bear's Island, lxiii.
 Beecher, xlv.
 Bahr el Abyadh, 49.
 Beisan, 114.
 Beke, Dr. C., xxxvii. lvii. 48, 77.
 Belcher, Sir Edward, lvi.
 Belgium, xlv.
 Belid, 4.
 Ben Aulder, 103.
 Ben Nevis, 103.
 Beni-Sakher, 108, 110, 117.
 Berbera, 133, 138.

- Berenike, 62.
 Bernados, lxviii.
 Bernard, Lieut., lix.
 Bertou, Comte de, 77, 90.
 Biggar, 102.
 — water, 96.
 Bird, Captain, lxiv.
 Bir el Breder, 105.
 Bheer Whalley, 137.
 Bhurt Kesal, 132.
 Blanchard, H., 45.
 Bolgart Spring, 20.
 Bonnington Fall, 98.
 Bonomi, Jos. lvii.
 Boodroom, xxxix.
 Boothia Felix, lxiii.
 Born, 50.
 Borneo, lv.
 Bosphorus, l.
 Botta, lii.
 Bouro, lxx.
 Bowes River, 44, 75.
 Boyeen Spring, 26.
 Boyne River, 4.
 Braeriach, Mount, 95.
 Brandreth, Henry R., xxxiii. xlvii.
 Brazils, 47.
 Berghaus, xl.
 British Isles, 99, 103..
 Brooke, Sir James, lv.
 Brown, Lake, 27.
 Buch, Leopold von, lxiii.
 Buchan, Capt., 20.
 Buchetium, 142.
 Buckingham, J. S., 79.
 Bükä's, 87.
 Bukáh, 111.
 Buller River, 44, 175.
 Bunbury, Charles, l.
 Burckhardt, 80.
 Burnett, Mr., 14.
 Burra-Burra, lx.
 Burtirrhí, 137.
 Byrne, J. C., lxii.

 Cabot, John, 20, 46.
 — Sebastian, 46, 47.
 Cabral, 47.
 California, lxvii.
 Carless, Capt., liii.
 Carthagena, lxix.
 Caspian Sea, 78.
 Catherwood, 86.
 Chagres, lxix.
 Champion, ship, 38.
 — Bay, 38.
 Chapman River, 39.
 Cherrie Island, lxiii.
 Chesapeake, lxx.
 Chesney, Col., 81.
 Chili, lxix.
 Chimerium, 139.

 Cichyrus, 144.
 Clavering, Capt., 25.
 Clyde, 97, 101.
 Coanga, 72.
 Cocytus, 143.
 Cohoes, Falls of the, 83.
 Coloé Palus (Dembea Lake) 53, 54.
 Cologne, 82.
 Columbus, 45.
 Cordova, Hernandez de, 47.
 Cortes, Hernando, 47.
 Cooley, W., xlviii. lv.
 Copiapo, lxx.
 Coromandel coast, liii.
 Cormorin, Cape, xlii. 62.
 Corra Linn, 98.
 Coulter, Dr., lxvii.
 Cruttenden, Lieut., xxxviii. 136.
 Cuawa, 72.
 Cuánene, 72.
 Cunningham, Capt. liv.

 Dahomey, lviii.
 Dannakil, 132.
 Danube, 82, 83, 94.
 Darien, Isthmus of, lxvi.
 Dausy, xliii.
 D'Avezac, 74.
 Dead Sea, xxxv. 77, 89, 91, 92, 104, 126.
 Deare, xl.
 Dee, 95, 102.
 Deine, 140, 141.
 Delaware Bay, lxx.
 Delegorgue, Adolphe, lix.
 Dickie, Dr., 102.
 Diggs, Sir Dudley, xlix.
 Dijeil River, 4, 6.
 Dinkaa, 57.
 Doonas, 197.
 Dujéil Canal, 2.
 Dulbahanti, 137.
 Dumont d'Urville, xli.
 Duncan, John, xxxvii. lviii.
 Dundaf Linn, 101.
 Dura, or Dúr, 12.

 Eaglestone Hill, 27.
 Edrisi, xliii.
 Eesa, 137.
 Eesah Somaulis, 132.
 Elaiatia, .
 Elbe, 83, 87, 94.
 El Dojúi, 2.
 El Káim, .
 El Kerma, 114.
 Engiddi, 126.
 Enterprise, ship, lxix.
 Epirus, 139.
 Ephyra, 139, 142.
 Erebus, ship, 22.
 Erie Canal, 83.
 Erman, xlvii.

- Badrælon, 78.
 Ethiopia, 54.
 Everest, Lieut.-Col., liii.
 Fairfax, Mount, 74.
 Fanari, 142.
 Fécamp, lxx.
 Felix, Cape, 62.
 Fell, Lieut., liii.
 Fellowes, Sir Charles, l.
 Fernandez, Antonio, 72.
 Ferozabâdi, 66.
 Feshkah, Ras-el, 129.
 Fethah, el, 17.
 Finn, Mr., 123.
 Finzi, Mr., 105.
 Fogo, Island of, lxii.
 Forbes, Capt., lv.
 Franklin, Sir John, lxx.
 ———, Lady, lxiv.
 Gabet, lv.
 Gamaro or Gimiro, 50.
 Gantheaume Bay, 74.
 Gay, M. Claude, lxix.
 Gebel el Qamar, or el Qomr, or Qomri,
 50, 53, 61.
 Gebel Shumsan, 61.
 Gerhajia, Habr, 136.
 Ghadames, lix.
 Ghirri, 137.
 Ghor, 108.
 Ghraat, xxxviii. lix.
 Gibé, lvii, 51, 72.
 ——— of Inarya, 50.
 ——— of Lega (river), 50.
 Gidr Beersi, 136.
 Glenmuick, 95.
 Glykys Limen, 142.
 Glynn, Joseph, lxvii.
 Gojeb, lviii, 50, 51, 53.
 Gom, 62.
 Goudar, 71.
 Good Alli, 131.
 Good Hope, Cape of, lv.
 Gråberg of Hemsö, Count, xxxii.
 Grant, 104.
 Greenland, 23, 46.
 Greenough River, 38, 42, 75.
 Gregory, Messrs., xxxvii, 26, 74.
 ———, F., 39.
 Grey, Capt., 71.
 ———, Port, xxxvii, 38.
 ———, Point, xxxvii, 35, 38.
 ———, stream, 75.
 Grijalva, John, 47.
 Grover, Captain, xxxiv.
 Gulf-stream, lxx.
 Habr Awal, 134, 136.
 ——— Gerhajia, 136.
 Habr't el Jahleh, 137.
 Hadharmot, 65.
 Hadramôt, 61.
 Haidinger, W., xlv.
 Hakluyt Society, lxx.
 Hale, Horatio, lxix.
 Halicarnassus, xxxix.
 Hamed es-sagheer, xxxviii.
 Hamel, Dr. J., xlix.
 Hamilton, W. J., xxxi.
 ———, W. R., 78.
 Hamrin range, 2.
 Harrowah, 133.
 Hatchett, Mr., xxxiv.
 Haweea, 136, 137.
 Haweisilât, 11.
 Hawkins, Sir Richard, lxx.
 Hebrawal, 134.
 Helpman, Lieutenant, xxxvii, 38, 74.
 Henlopen, Cape, lxx.
 Henry VII., 146.
 Hernandez de Cordova, 47.
 Hill, Mount, 39, 74.
 Hispaniola, 45.
 Hoffman, Colonel, xlvii.
 Hoffmeister, liv.
 Hommaire de Hell, 1.
 Hopkins, W., lxx.
 Houghton, William, lv.
 Howeish, 2.
 Huc, lv.
 Hügel, Baron, liii.
 Hudson's Bay Company, xxxix.
 Hudson's Bay, lxiv.
 Hughes, William, lxxx.
 Humber, 99.
 Humboldt, A. von, xlv.
 Hurrurb, 135.
 Husein Askari, 8.
 Hûleh, 77.
 Hutt, or Arrowsmith, River, 32, 75.
 Imân Mehdi, 8.
 Imân Sayyed Hosein (a tomb), 4.
 Inarya, xxxviii.
 Investigator (ship), lxix.
 Irâk, 7.
 Irby, Lieut., 42, 79.
 Irwin (river), xxxvii, 35, 38, 95.
 Istâbolât, 6.
 Jackson, Colonel, xl, lxxi.
 Jahleh, Habert el, 137.
 Java, lv.
 Jebbûr Araba, 3.
 Jebel Hamrû, 17.
 ——— Mak-hûl, 17.
 Jerusalem, 86.
 Jisr, Mejamia, 111.
 Johnston, A. K., xl, xli.
 Jomard, xliii, 74.
 Jones, Lieut. J. T., 1.
 Joobul Kharib, 131.

- Jordan, xxxv. 79, 83, 89, 94, 95, 104.
 ——— Valley, 77, 104, 123.
 Judea, 78.
 Jurjew (Yúryef), Mr., xlvii.

 Kádhomein, 1, 8.
 Kádísfyah, 5.
 Kaffa, xxxviii.
 Kaleb Abú Reyyáh, 16.
 Kámát, or Káriz, 8.
 Kano, xxxviii.
 Kantarah el Resás, 7.
 Káriz, 8.
 Keilhau, lxiii.
 Keith, Dr. Stene, 95, 102.
 Kellet, Capt., lxviii.
 Kennedy, Mr., lxi.
 Keppell, Capt., lv.
 Kerma, Island el, 114.
 Kerbelá, 8.
 Keyserling, Count, xlv.
 Kháli, or Sidd Nímírd, or Median Wall,
 4.
 Khalis Canal, 2.
 Khán River, 13.
 ——— Alessar, 112.
 ——— Lozám, 13.
 ——— Kharnéínah, 16.
 ——— Mizrákjt, 4.
 ——— Tarmiyah, 1.
 ——— Suweidíyáh, 1.
 ——— Tholfiyah, 21.
 Khor, 138.
 King, Captain, 74.
 Krusenstern, Mr. Von, xlv.
 Koluteboy (Island), 22.
 Kolyma, river, 21.
 Kosmos, xlv.
 Kotelnoy (Island), 21.
 Kubar, 16.
 Kowalski, xlvii.
 Kurn-es-Surtubeh, 80.

 Laacher See, xlv.
 Lady Pelly (Cape), lxiii.
 Laguillermie, lxiii.
 Lam-Almon, 65.
 Lambton, Lieut.-Colonel, liii.
 Lancaster Sound, lxiv.
 Lapie, Colonel, 1.
 Layard, A., lii.
 Leake, Colonel, 139.
 Lebweb, 88.
 Lechlade, 101.
 Legh, 95.
 Legnashinna, 99.
 Legleg, 16.
 Leichhardt, Dr., lxi.
 Leigh, Thomas, xxxviii.
 Lena (River), 21.
 Lepsius, Professor, lii.

 Linn, 96.
 Lítány, 87, 88.
 London, survey of, xxxix.
 Long, George, xxxiv.
 Long Island Sound, lxv.
 Lord Mayor's Bay, lxiv.
 Lough Foyle, xxxix.
 Low, Mr., lvi.
 Löwen, Colonel, xlv.
 Ludolf, 56.
 Lunas Montes, 53.
 Lynch, Captain, 1, 4, 94.
 Lycia, 1.
 Lyscomb, 104.

 Mackinnon, Captain, lxix.
 Magellan, 47.
 Magnussen, Professor, xxxiii.
 Mahjammah, v.
 Mahmahr, Ras, 131.
 Mahommed Ali, 50.
 Maine, state of, lxv.
 Malawiyah, 8.
 Mallet, Mr., lxx.
 Mangles, 79.
 Mansúriyah, 2.
 Marcel, 56.
 Marryat, Frank, lvi.
 Martens, Charles, lxiv.
 Mashukah (mounds), 9.
 Matthew Paris, lxiii.
 Maury, Lieut., lxvi.
 Mayence, 82.
 M'Queen, Mr., xxxviii.
 Meadows, Th. Taylor, lv.
 Median wall, 4.
 Mehdí, Imám, 8.
 Mehjir (mounds), 11.
 Melnik, 81.
 Melville Peninsula, lxiii.
 Mexico, lxvii.
 Mier, 65.
 Misselad, 68.
 Missouri, 83.
 Mitchell, Sir T., 14.
 Moaghdbem, 2.
 Moegi, 53.
 Mohammed (Iman Sayyed), 2.
 Mohatissca, ix.
 Mohawk, 83.
 Molyneux, Lieut., xxxvi. 104.
 Mono-Moezi, 50, 66.
 Monterey, lxvi.
 Moon, mountains of the, lix. 50.
 Moore, Mr., 77.
 ——— (Commander), lxiv.
 ——— Point, 42.
 ——— river, 37.
 Moresby's range, 42.
 Motásim, 8.
 Moutrion, Lieut., liii.
 Mount Hill, 74.

Mourzuk, lix.
 Mozambique, lix.
 Mukdesbah, 136.
 Mundy, Capt. Rodney, lvi.
 Murayah, 138.
 Murchison, Sir R. I., xlii.
 Murreyhán, 137.
 Mushakh, 130.
 Mijjertheyn, 137.

 Nahl, 66.
 Nahr, 7.
 Nahr Háfi, 16.
 Nahr Milh (Salt River), 18.
 Nahrawán, 2.
 Nantucket, lxx.
 Nashero-el-Ne'am, 56.
 Newfoundland, 146.
 Nile, White, xxxvii. lvii. 48.
 Nineveh, lii.
 Nitocris (steam-ship), 1.
 Noeggerath, Professor, lxx.
 Noury-el-Baqui, 56.
 Nuñez de Balboa, 46.
 Nyaf, 8.
 N'yassi, 50.

 Oeynhausén, Professor, xlv.
 Ogahden, 137.
 Ojéda, 45.
 Oor Singali, 137.
 Opia, 7.
 Orontes, 81, 83, 87.

 Park, Mungo, lviii.
 Palestine, 85.
 Parga, 141.
 Paris, xliii.
 Parry, Sir E., 20.
 Passan, 82.
 Patagonia, 47.
 Pechora, xlv.
 Pedrarias, 46.
 Perth, 74.
 Petermann, Aug., xxxv. xl. 89.
 Phanari, 142.
 Philip Broke, Cape, 25.
 Philip, Port, 1.
 Pinzon, Vincenti, 46.
 Pizzigani, xliii.
 Pizarro, 46.
 Plata, river, 47.
 Polynesians, lxx.
 Porto Phanari, 142.
 Psammetichus, 56.
 Ptolemais Theron, 63.
 Ptolemy, 48.

 Qamar, Gebel el, xxxvii.
 Qamre, 62.
 Qelemánsi, 72.
 Qomri, 50.

Quillimane, lix.

 Rae, Dr., xxxix. lxiii.
 Raffenei, M., lix.
 Ras-el-Balkah, 129.
 Ras-el-Feshkah, 129.
 Ras-el-Fil, 62.
 Ras-el-Taflah, 129.
 Ras Mahmahr, 131.
 Recherche (ship), lxiv.
 Rennel, 74.
 Repulse Bay, lxii.
 Rhine, 82, 83, 94.
 Richardson, James, lix. lxiv.
 Rich, Mr., 12.
 Rísha, 129.
 Ritter, Carl, li. lxx. 74.
 Robinson, Dr. Edward, xxxv. 77, 89.
 Rochet (d'Héricourt), lvii. lviii.
 Rocky Mountains, lxviii.
 Roe, Lieut., 74.
 Rome on the Hudson, 83.
 Roosen, Capt., xlv.
 Rosen, Count, xlv.
 Ross, Sir James C., lxii. 4, 19.
 Russeger, Dr., xxxv. 77, 90.
 Ruxton, G. F., lxviii.

 Sabseans, 56.
 Sabakos, 57.
 Sabea, 65.
 Sabine, Lieut.-Col., 25.
 Sadâyah, 2.
 Sahara, lix.
 Saint Preuve, Mons., lvii.
 Saint Simon, Marquis de, 90.
 St. Salvador, 45.
 Sámarrah, 719.
 Samen, 65.
 El Sanam, 6.
 Sandwich Islands, lxx.
 San Juan, river, lxviii.
 Saráwak, Rajah of, lv.
 Sardinia, xlv.
 Sarracoleta, lix.
 Saubat, 68.
 Saunders, T. W., xli.
 Savi, Professor, lxix.
 Sayaral, 135.
 Schaffhausen, 83.
 Schandan, 81.
 Scharf, George, 1.
 Schomburgk, Sir R., lxviii.
 Schubert, 77, 90.
 Schultz, 86, 124.
 Sefurieh, 105.
 Seguia, 118.
 Senaar, 69, 70.
 Severn, 93, 94, 97, 99.
 Shammár Araba, 10, 12.
 Shannon, 97, 99, 100.
 Shat-el-Aidhá, 1.

- Shawa, 65.
 Shefat 'Amar, 105.
 Sherri'at-el-Beidha, 1.
 Sheri'at-el-Wojá, 13.
 Shillooke, 57.
 Shoaberri, lviii, 51, 68.
 Siberia, New, 21.
 Sidd-el-Aziz (river), 4.
 Sidd Nimroúd, 4.
 Sieder, xlv.
 Simpson, xl. lxx.
 Sinai, lii.
 Siudiyah, 2.
 Skene, J. H., 139.
 Smith, Rev. Eli, 78.
 Smith's Sound, 25.
 Somali, Bur e, 136.
 Somerville, Mary, xl.
 Spartan, ship, 104.
 Spitzbergen, lxiv., 21.
 Spruner, xlv.
 Stein, 82.
 Stokes, Capt., 74.
 Stonebyers Fall, 98.
 Strachey, Lieut., liv.
 Sufúk, sheikh, 11.
 Summakh, 109.
 Sydow, xlv.
 Syene, 54.
 Syhadree range, 70.
 Syria, 1.
 Symonds, Lieut., 78, 86, 89, 90, 104.

 Tabor, mount, 106.
 Tañlah, Ras el, 129.
 Tarmiyah, 1.
 ——— canal, 2.
 ——— water, 6.
 Tehama, 67.
 Tchibatcheff, Pierre de, 1.
 Tekrit, 13.
 Tel Alij, 9.
 — Renát, 13.
 — Kheir, 1.
 — Kush, 1.
 Tel-el-Kady, 103.
 Tembaktú, 66.
 Temple, Sir Grenville, xxxiv.
 Terror, ship, 22.
 Thames, 95, 99, 100, 101.
 Thompson, Dr., liv.
 Tiberias, Lake of, xxxv. 77, 91, 92, 107.
 Tigris, 1.
 Tipping, 86.
 Toodgay, brook, 37.
 Toryne, 142.

 Tradescant, John, xlix.
 Tripoli, xxxviii.
 Turumbah, 1, 18.
 Turan, 105, 106.
 Tuscany, lxx.
 Tweed, 94, 96, 101.

 Ural, northern, xlvii.

 Vandermaelen, xlv.
 Van der Velde, lv.
 Varlam, cape, 139, 141.
 Vera Cruz, 47.
 Vespucci (Amerigo), 45.
 Vesuvius, xlviii.
 Victoria River, lxi.
 Victoria Plains, 37.
 Vienna, 82.
 Vincent, Dr., 54, 55, 56.
 Visconti, Ferdinand, xxxii.
 Vivien de St. Martin, lv.
 Vuvo, 143.

 Wabe, 72.
 Wadi Nogal, 137.
 Walckenaer, xliii.
 Waldemar of Prussia, Prince, liv.
 Water Peak, 75.
 Watson, H. C., lxx.
 Waugh, Lieut.-Col., liii.
 Webb, river, 136, 137.
 Wildenbruch, Baron von, xxxv. 78, 90.
 Wilkes, Capt., lxix.
 Wilson, Dr. John, li.
 Winter, 104.
 Wittich, W., xxxiv.
 Wizard Hill, 74.
 ——— Peak, 42.
 Wolcott, 86.
 Wolfe, Dr., xxxiv.
 Wolstenholme Island, 23.
 Wrangel, F., Admiral, 19.
 Wursungeli, 137.
 ——— range, 138.

 Yemen, 54, &c.
 Yolland, Capt., xxxix.

 Zaa, 65.
 Zambezi, xxxviii. 72.
 ——— lake, 51.
 Zerka, 119.
 Zeylah, 131.
 Zingabéné, 65.
 Zingabar, 65.

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